FLYING ACES

FACT MODEL BUILDING FICTION

K 15¢ MARCH

REVIEW OF JAPANESE WARPLANES
by WILLIAM H. RANDALL

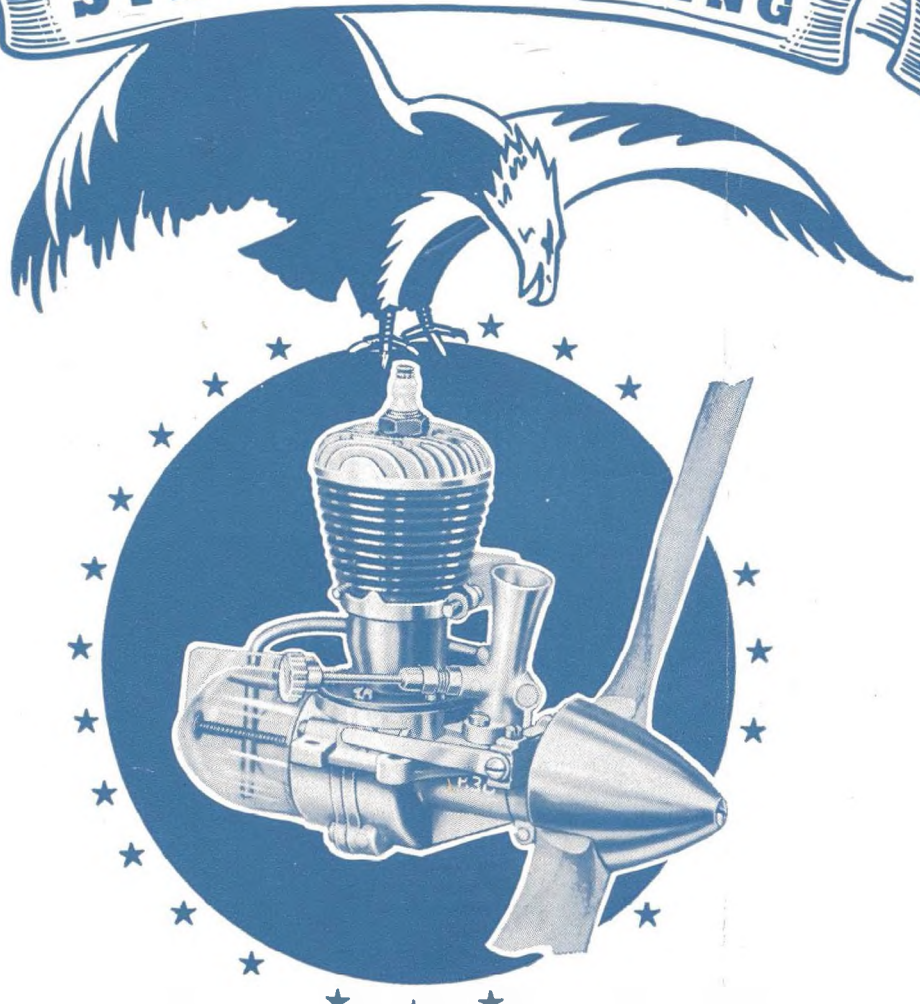
AMERICA'S AIRPOWER TODAY
by MAJ. GEN. H. H. ARNOLD

LATEST AIR CORPS TRAINER
THE CURTISS AT-9

SCHOMBURG

"18-MINUTE MEN OF THE AIR" by F/O JOHN L. SCHERER • "WHAT'S IN A NAME?"
"Q"-AGENT DICK KNIGHT AND LOTHARIO DOYLE • P. PINKHAM AND THE NINTH
MODELS: "HISTORY OF AIRCRAFT INSIGNIA" • "GLOSTER GAUNTLET SOLID SCALE"

START 'EM FLYING



★In these times of national emergency you can do your part by learning the theory of Aviation. ☆ Invaluable training is yours by the experience you gain by participating in the building and flying of gas models. ☆ Phantom Motors, realizing this have made every effort to give you only the finest equipment at a price you can afford. ☆ The Phantom P.30 operates on the same primary theory as a real airplane motor. And is designed to give you years of worthwhile pleasure. ☆ May we suggest you order a P.30 today, and lay the groundwork for a career in aviation tomorrow.

P-30 Specifications 1/5 h. p.; 2 port 2 cycle; .710 bore; .750 stroke; .295 cu. in. displacement; bare weight 5¼ oz. Vacuum feed downdraft carburetion, will not siphon tank dry. ¼" crankpin; bronze bearings. Turned steel cylinder; lapped alloy steel piston; new patented principle of by-passing, eliminates piston deflector. Cylinder and by-pass one integral part; full ⅜" crankshaft; square rotary valve port; oversize anti-friction bronze bearings; lucite plastic gas tank; Champion V-2 spark plug; enclosed condensers; die cast connecting rod. Smith coil. Timing cam integral part of crankshaft. Hollow steel alloy crankshaft. Visible gas capacity. Motor built to be used upright or inverted. Gas tank can be mounted on either side of fire-wall. Newly designed connecting rod. Large ground steel piston pin. Needle valve conveniently mounted, clearing prop.

☐ Money-order enclosed

- ☐ New Phantom "P.30" complete with coil, tank, condenser and prop spinner $9.75
- ☐ Phantom "P.30" flywheel $1.25

☐ Send C. O. D.

- ☐ New Phantom "P.30" complete with coil, tank, condenser and flywheel $10.50
- ☐ Special 12 inch hardwood propeller . . . . 49¢

NAME_____

ADDRESS_____

CITY_____ STATE_____

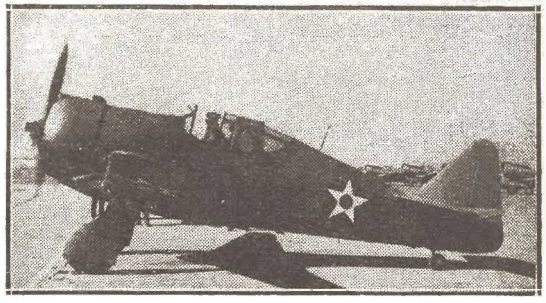
Foreign Countries 75¢ extra *Add 3% in California*

PHANTOM MOTORS ★ 800 EAST GAGE AVENUE LOS ANGELES, CALIFORNIA

Maj. Gen. H. H. Arnold

explains on page 2—with no punches pulled—how our Army Air Force has advanced from a token air arm to a second-to-none wielder of aerial might. This is one of the most outstanding features FLYING ACES has ever presented. Read it thoroughly!

One of the latest pursuits undergoing tests is the North American P-64, which is similar to the NA-50.



FLYING ACES

A. A. WYN, *Editor* **DAVID C. COOKE, *Managing Editor***

JESSE DAVIDSON, *Associate Editor*

VOLUME XL MARCH, 1942 NUMBER 4

FACT AND FICTION

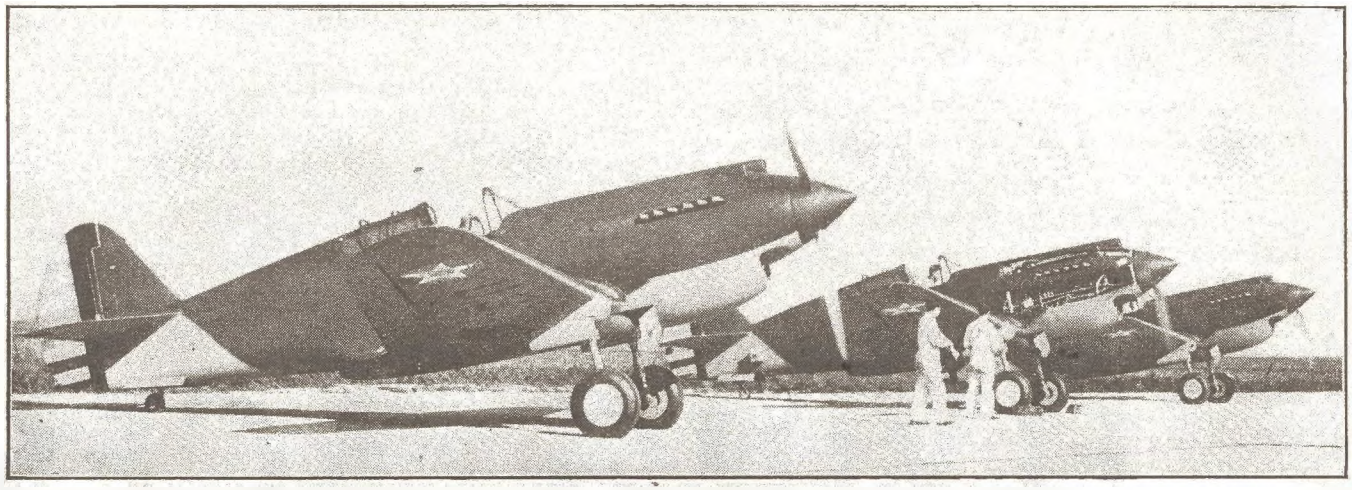
MODEL BUILDING

DEPARTMENTS AND FEATURES

Cover Painting by August Schomburg

Published monthly by Magazine Publishers, Inc.; office of publication, 29 Worthington St., Springfield, Mass. A. A. Wyn, President, Editorial and executive offices, 67 W. 44th St., New York. Entered as second-class matter, Nov. 14, 1928, at Springfield, Mass., under Act of March 3, 1879. Title registered in U. S. Patent Office.

For advertising rates address FLYING ACES Magazine, 67 W. 44th St., New York City.
Subscription rate: $1.50 for twelve issues in the United States, $1.75 in Canada; and $2.50 in all other foreign countries. Single copies, fifteen cents.



Even though the P-40 has been found superior to the Hurricane, the U.S. Army rates it no better than a good pursuit trainer.

AMERICA'S

From a comparatively weak force, our Army's air arm has developed into a formidable might capable of meeting and dealing with any hostile nation!

by Maj. Gen. H. H. Arnold

Chief of the Army Air Forces

BEFORE the expansion the Air Corps had roughly 2,000 officers, including reserve officers and those detailed from other branches of the Army, and 20,000 enlisted men, at a time when the German Luftwaffe was training an air giant of 1,000,000 officers and men.

We had one small-output training center, composed of Randolph and Kelly Fields at San Antonio, Texas, which graduated three classes a year —usually of less than 100 pilots in each class. Furthermore, the blight of too little funds over a period of too many years had reflected itself in all our combat airplanes.

In pursuit, we had an experimental order for 13 Curtiss P-40's, a first-class fighter; however, most of our squadrons were flying obsolescent types whose fire-power of one .30 and one .50 caliber machine gun each was a pin-prick.

In bombardment, we had the first models of what has since proved to be the most outstanding bomber in the world—the B-17. Today, England and other countries are pleading with ever increasing fervor for any of that type they can get, from one up to 1,000. But we had only 13 of them.

The bulk of our bombardment squadrons were equipped with B-18's, a sitting target for even the slowest of our pursuit planes, and under-powered and slow. They were duds on every count except training, where they were a life-saver.

Frankly, pursuit had been allowed to drift in the doldrums, and in bombardment we had a 100 percent surplus of a type we could use only for training and a 99 percent shortage of the B-17 type we needed.

We had about 1,000 combat type airplanes, compared with thousands today—a total built up in spite of heavy diversion of planes abroad. We had a handful of planes outside the Continental United States as against many hundreds in foreign service units today.

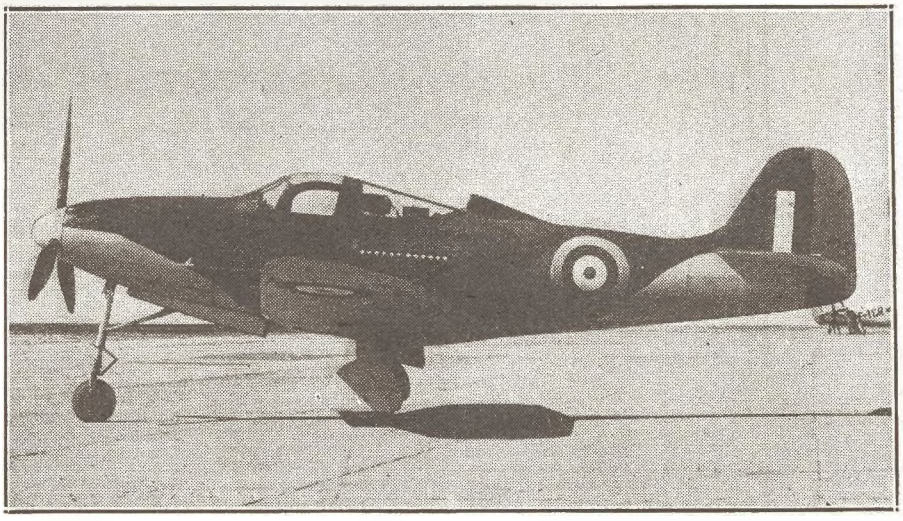
We had less than 20,000 enlisted men as against more than 180,000 today. We had two or three hundred aviation cadets as against the 10,000 now in training. We had about 2,000 officers as against a present strength of nearly 17,000.

We had practically no funds either for development or additional procurement, and there appeared to be no prospect of flesh and blood for the skeleton of our air strength. On the part of some of our leaders there was a sad reluctance to admit that the airplane was here to stay.

But the Commander-in-Chief in the White House was not one of these. His recognition of our aviation deficiencies and his vision, expressed to us during the fall of 1938, were well ahead of public opinion. In January, 1939, after consultations with the President, we outlined to Congress his proposals to raise our Air Corps objective from 2,320 planes, a dangerously deficient target which we had never been able to reach, to 5,500 airplanes and an objective of double our existing strength in officers and men.

That plan appeared to be adequate at that time. But after the invasion of Poland in September, in which it was demonstrated to the world that airpower packed a Sunday punch, it was clear that the goal for the Air Corps must be revised sharply upward—at once.

Congress passed supplemental appropriations during the next few months to augment the program. Here is how rapidly ideas and plans



In British service, the Bell P-39 type has demonstrated it is a match for the Spitfire and Messerschmitt up to 16,000 feet.

AIRPOWER TODAY

can change. In January, 1940, our Air Corps made an estimate of 1,200 planes required for our needs. That was pared down by various agencies so that we appeared before Congress with a request for 496 planes. After arguing for two months, the House of Representatives reluctantly approved a total of 59. The Senate raised that number to 157.

In May, the French Army broke in disorder, and we were given by Congress about $1,000,000,000 and over 4,000 planes.

Alarmed by the German smash through the Low Countries into a wingless France whose skies were bare of fighters, the President called a conference of defense leaders. The figure he dropped on us was a sash-weight—50,000 airplanes a year. The Army had only 2,000 airplanes and here was the Chief Executive talking about building to an annual production of 25 times that number.

However, we didn't begin to shoot immediately toward a goal of 50,000 airplanes for the Air Corps, since the money the President had in mind did not provide for air bases, overhaul depots, housing, personnel, or flight training facilities to balance the program.

DURING 1940 AND 1941, expansion was piled on expansion like plywood until we are now embarked upon a program which calls for the training of 30,000 pilots and 70,000 mechanics a year to man an organization which, if we meet our objective, will give us an ultimate strength of 41,000 officers and 600,000 enlisted men, including auxiliary personnel from other branches of the Service—or over four times the strength of the whole Army a short time ago.

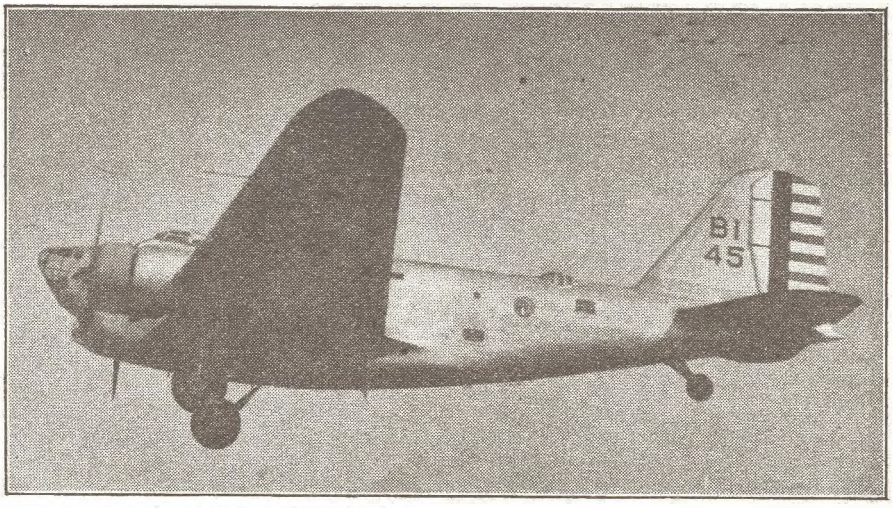
I am proud to be able to tell you that the pilot training program has been a bright spot from the beginning of the current effort, when we decided on a policy of letting contracts for elementary training to qualified civilian schools under Air Corps supervision. Since selection of the first nine in June, 1939, the plan has been a natural.

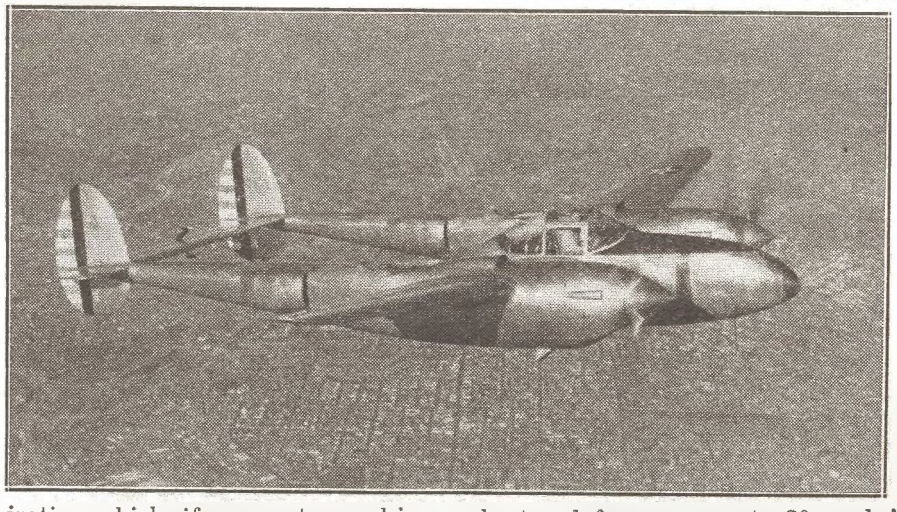
At present we have 26 civilian schools giving primary training and three giving basic training. By June, 1942, there will be 41 primary schools, 18 basic and 21 advanced schools turning out Air Corps pilots at the rate of 30,000 a year. In other words, we had two schools three years ago; next June we will have 80. But don't let that give you the idea that we've lowered the standard in order to turn out pilots like link sausages. The rate of elimination for failure to meet the standard of flying proficiency—around 50 percent—is about as high as before.

Although the course has been shortened from a year to 30 weeks' flight instruction, the new graduate receives better training than in the past. He climbs into our newest and hottest equipment and brings it back right side up. He reports directly from the advanced school into instructing or supervisory work at the civilian contract schools, and what he lacks in experience he is apparently making up in enthusiasm and hard work.

This has been reflected in the mean accident rate while the expansion has been under way, compared with the three years prior to the shortened training course. You would normally expect the rate to zoom. Exactly the reverse has occurred. The rate has gone down and the trend is still down. This year the accident rate in basic training has been half what it used to be and fatal accidents in advanced training have fallen off 50 percent. This in spite of the pressure under which we have had to operate.

The record is equally good for mechanics and technicians whom we are training in 14 civilian schools, besides the five schools under our Air Corps Technical Command, to help us reach the mark of 70,000 a year. Along with all this, we are training British pilots and navigators under a schedule which calls for 7,000 pilots and 1,000 navigators to undergo training annually, and we are qualifying an adequate supply of bombardiers and navigators, on non-pilot status, for our own combat crews.





Duds on every count except training, B-18 models were under-powered and slow. They were sitting targets for even old pursuits.

Left: Like the P-39, the Lockheed P-38 has proved to be superior to many British and German models. However, it is far eclipsed by the new single-engine Republic P-47B.

No one denies that we were short on types with which to go into mass production when this war broke out. As I've pointed out, we had the Curtiss P-40 and the Boeing B-17 and we were well fixed for trainers.

Modifications were necessary in the P-40, and we have been incorporating them into our later pursuit models—armor plate, leak-proof tanks, more rugged landing gear for unprepared fields, and, especially greater firepower. The British like eight or more machine guns, preferably of unmixed calibers. By that I mean they favor all .50 caliber or all cannon rather than, say, a combination of .50's and .30's. In fact, .30 caliber machine guns for fighters are on the way out. They lack the necessary sting.

Hundreds of P-40's have been built and delivered to pilots in our squadrons and to the British, who have found them superior to the Hurricane. They have given an excellent account of themselves against the Luftwaffe in Egypt and have been adopted as standard equipment in the Near East, although we no longer rate the P-40 as better than a good pursuit trainer, because of its limitations in speed, ceiling, and fire-power.

The B-17, even in its original form, represented a long head start over any of the heavy bombers of foreign nations. The Air Corps' championing of this type has been amply vindicated and has enabled us to go into large production without drastic changes. The ceiling and speed have been well increased through the use of turbo-superchargers; armor, leak-proof tanks, power-driven turrets, and tail guns have been added to make them an even better fighting machine than they were.

The first 20 B-17's operating with the RAF have provided enlightening performance reports. Our performance data had been worked out only up to 25,000 feet, and within those limits the ship gave no trouble. But the British wanted to operate them at 35,000 feet with a full load, which created plenty of new problems. To meet these difficulties, which come under the head of pioneering, changes were made and the B-17's executed for some time successful day and night raids over Germany at 34,000 feet with virtual immunity from enemy fighters and ground fire.

For the rest of our aircraft requirements, then, we had to embark on an extensive and hazardous program of buying airplanes on paper, without the usual service testing. Bugs cropped up in the new ships, but such difficulties are not going to stop us from procuring in ever increasing quantity the best fighting airplanes in existence. Make no mistake about that.

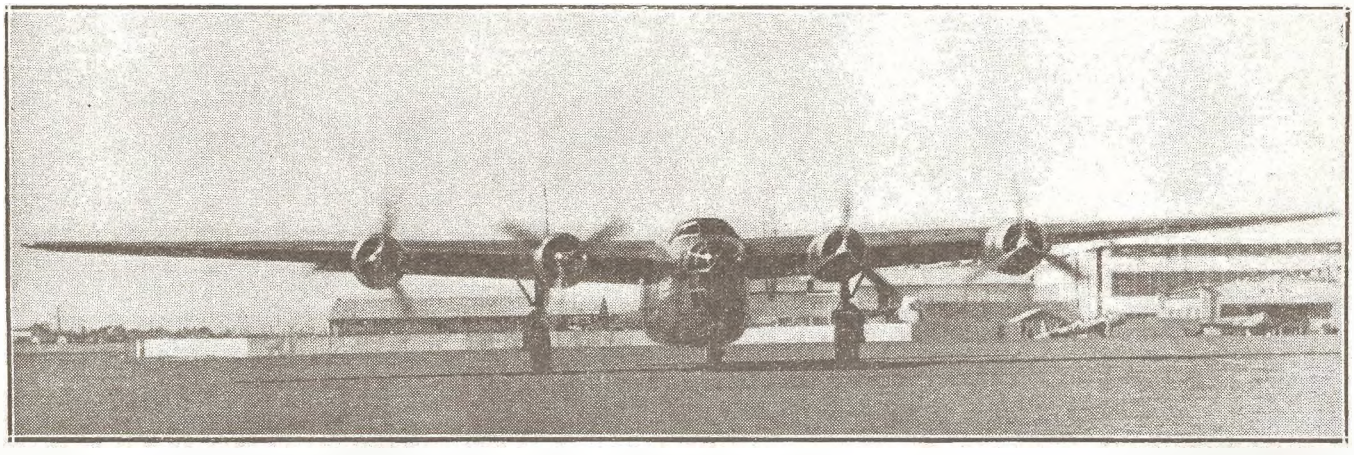
In the pursuit category, we have reached the large production stage on our single-engine Bell P-39, a type that has demonstrated it is a match for the Spitfire and Messerschmitt up to 16,000 feet, and on our Lockheed P-38. Eclipsing both of these, however, is the new single-engine Republic P-47B.

In various stages of development are pursuit types which will make all current types look obsolete.

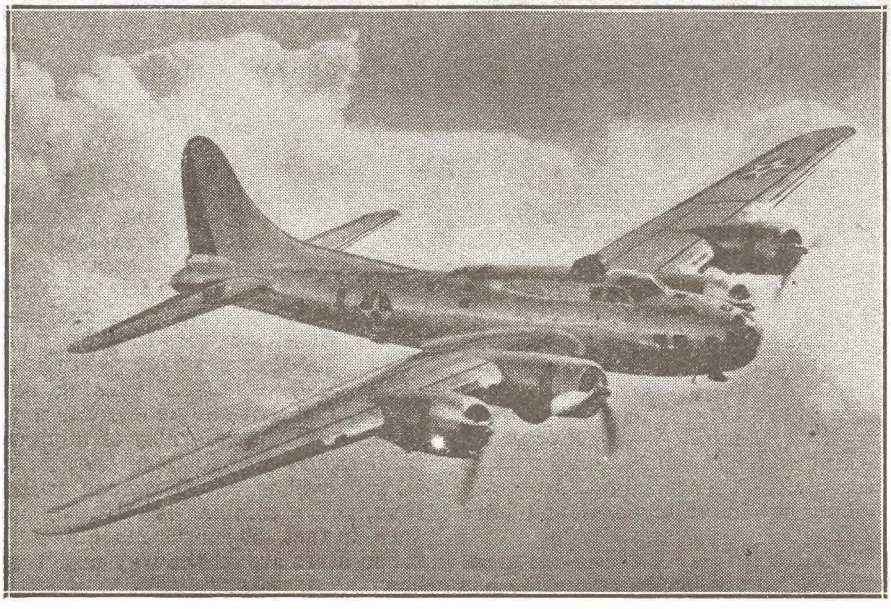
The Douglas A-20 series, a splendid light bomber and night fighter, has been rolling off the assembly lines in shoals, and so has the Martin B-26, a medium bomber of outstanding speed and defensive armor and armament.

The RAF already has many of our four-engine Consolidated B-24 bombers. The B-24 is so maneuverable, in spite of its size, that the Coastal Command has stuck four cannon in the nose, equipped it with anti-submarine devices and depth charges, and used it as a fighter. New versions of the Consolidated and Boeing will have really startling performance.

AN AIRPLANE is designed around its engine, so it has fallen on Wright Field to develop power plants of higher and higher output. And the Materiel Division at Wright Field, true to its tradition, has not been sitting around with its thumb in its mouth. They are testing an engine out there now that develops well over 2,000 h.p. Still in the design stage at Wright Field are power plants that will turn up still higher power. Once you get up into horse power brackets like that, you've got a headache finding a prop that will absorb the horses. The use of as many as eight blades and counter-rotating props will probably be the answer, since you can't put a 30-foot prop on a pursuit plane.



The B-24 is so maneuverable, in spite of its size, that the British have stuck four cannon in the nose and are using it as a fighter. Below: B-17 types have executed many bombing raids over Germany at 34,000 feet with virtual immunity.



Reports on new airplanes and engines are very encouraging, because they mean that our Materiel Division is planning to provide our Air Forces with the best fighting planes the world has ever seen.

Our first aim has been to keep our squadrons "flying, shooting, and bombing." The shortage of equipment has been acute and a very dangerous threat to pilot morale, but we can look forward to a steady increase in airplane strength. The continual process of activating new units and spreading experienced personnel ever thinner has placed a severe strain on us all. But we'll have to take it and like it. There's a war going on.

Do you remember the difficulties encountered by the Air Corps when it carried the mail in 1934? We have been doing a somewhat similar job with our Air Corps Ferrying Command, but on a much vaster canvas and with much more success and efficiency. There were cogent reasons

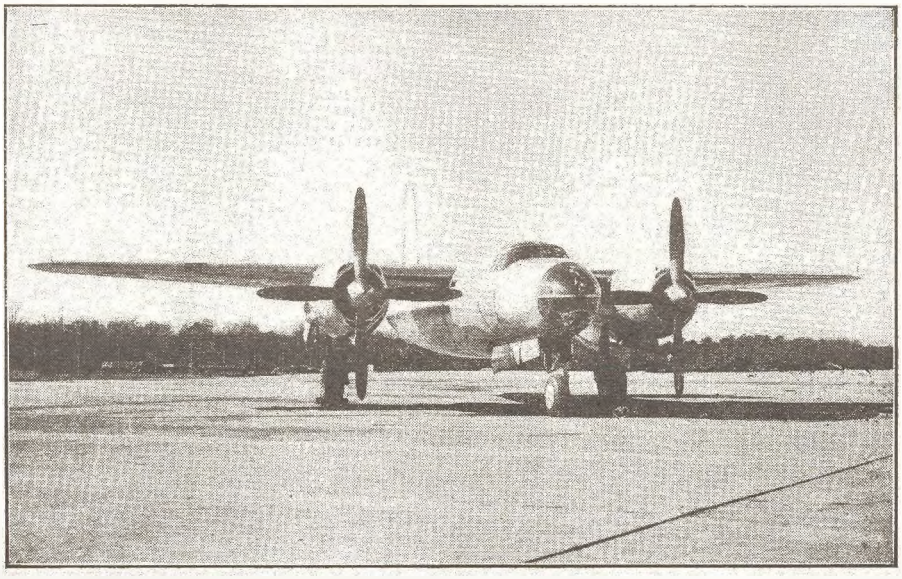
why the Air Forces undertook the project of transporting airplanes from the factories to their points of departure from our shores.

Obviously the British couldn't spare the pilots to do it. We could.

Ferrying meant training on latest types for pilots starved for equipment.

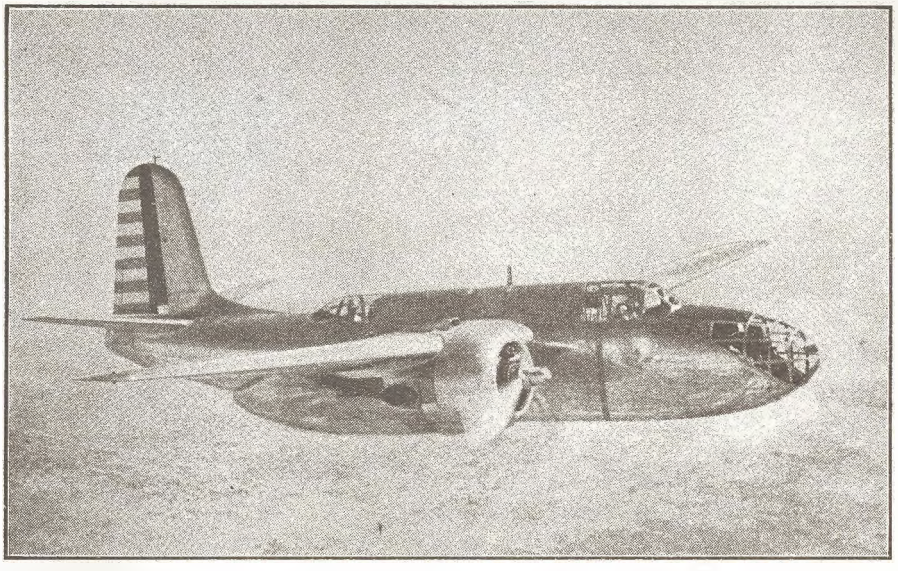
An Air Corps Ferrying pool was more flexible and less expensive than staffs of civilian pilots under contract to individual factories, any of which might have to throw their pilots into idleness through a plant shut-down.

Here is the record of the Air Corps Ferrying Command from June to October, 1941: In that initial period we moved over 900 planes from the West Coast to eastern terminals, with only two fatal accidents and at an average of two days en route as against eight days en route for the civilian ferry service. On a normal day, 40 planes were in transit, many of them piloted by boys fresh out of a twin-engine Advanced Flying School. To date, no plane ready to leave the factory has been delayed more than



Martin's B-26 medium bomber has been rolling off the production line in shoals. It has exceptional maneuverability and speed.

Designed in the first place as an attack-bomber, the British were so pleased with the A-20 that they made it a night fighter.



24 hours, barring zero-zero weather. More than 300 ferry pilots have been absorbing excellent experience in concentrated doses. A pilot ordinarily makes 35 deliveries in a 35 day period, and he is permitted to make more if he wants to.

Except for our short-range planes, the Air Corps Ferrying Command is capable of operating around the world. Its navigators are studying globes—not maps—and they would take a bomber to Tibet or Little America if you gave them 48 hours' notice.

In line with our hemisphere defense policy of forcing an enemy to run into our fist instead of our chin, we are guarding our Eastern approaches with Air Force stations from Iceland and Greenland to Labrador in the frozen North, to Georgetown, British Guiana, on the tropical coast of South America; aerial sentinels guard our Western approaches from Alaska to the Philippines; and our Southern approaches, including the Panama Canal, are protected with a greatly augmented Caribbean defense system, with both air and ground troops under an Air Corps officer, Gen. Frank Andrews.

In the North Atlantic region, our most recent area of development, we are garrisoning eight large bases and four radio and weather stations where 20 to 30 men will maintain emergency staging fields.

In Alaska, we have a composite squadron conducting experimental cold weather tests at Ladd Field, Fairbanks, and a composite group of pursuit and medium and heavy bombardment at Elmendorf Field, Anchorage. Bases are preparing at Metlakatla, Yakutat and Nome, while the Civil Aeronautics Board is constructing 10 fields at sites chosen by the Army along the Aleutian Islands aiming toward the defense of Dutch Harbor.

Shifting back to the Atlantic side, I could point out a few more places where Engineer troops are busy constructing fields: Bermuda, Jamaica, Antigua, Santa Lucia and Trinidad.

By this time you are probably getting some idea of the scope of the Army Air Force activities and an understanding of the desire that comes over us sometimes to go away and catch up on our sleep.

But there are many others besides those of us in the States who would like to catch up a few days' sleep—for instance, the 78 Air Corps officers who are on duty as foreign observers. They are the eyes and ears of the Air Staff. Their reports come in from South America, Canada, Egypt, England, Germany, Russia, Morocco, Turkey, China, Singapore—almost any place you can name, and they bow to no adventurous foreign correspondent when it comes to the pursuit of new developments in Ankara or Karachi. From the information they furnish us, we are able to modify our present plans and set up future plans.

OUR AIR WAR Plans Section has a many-sided and never-ending task. It is continuously studying the economic set-up of possible enemy nations in order to determine what objectives are vital and vulnerable to air attack. The large objectives are broken down into smaller objectives—for example, a system of locks whose destruction would throw a waterway system out of operation. A large country may have 150 such targets requiring exhaustive study.

I don't think it would be fair to conclude without giving you a glance at the lessons we have learned about military aviation during the conflict now entering its third year. Here are a few samples:

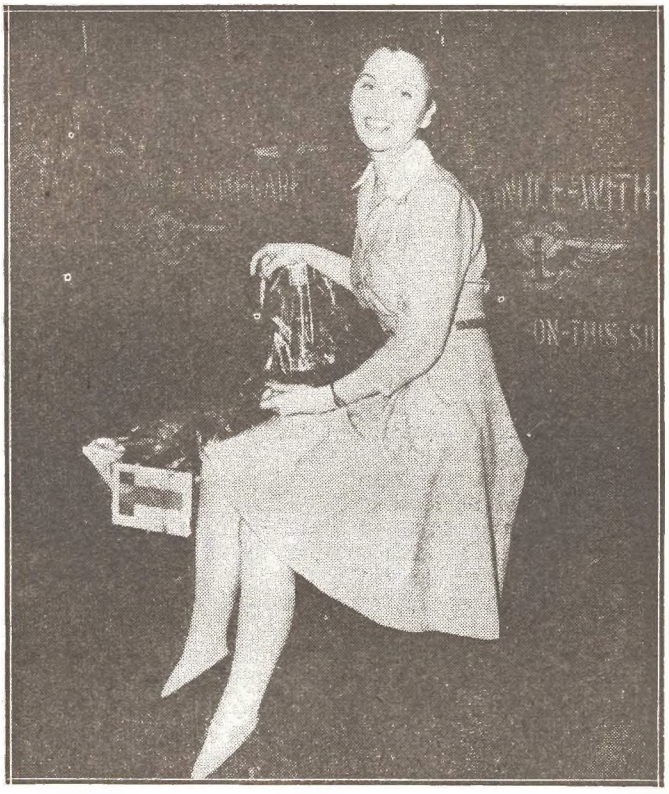
The Army and the Navy must have the whole-hearted cooperation of the Air Force. Air units needed for direct and intimate functioning with Army and Navy forces should be under the command of those forces.

The full weight of airpower must be available either for purely air operations or for the support of the naval or land operations, whichever may be of decisive importance at the time. This is an expression of the one

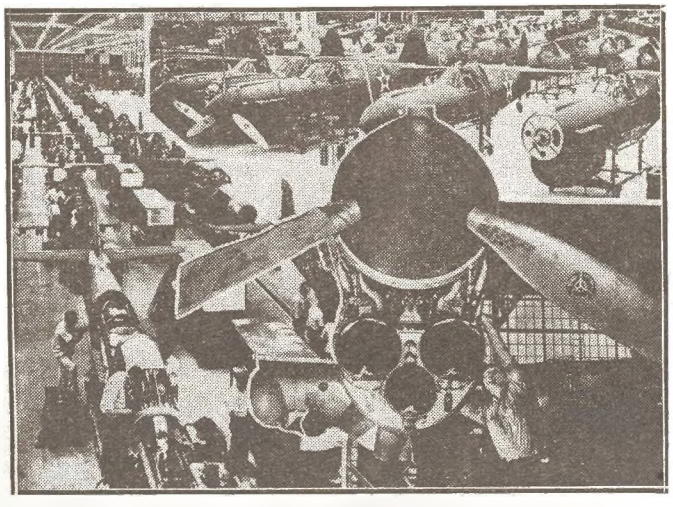
(*Continued on page* 79)

Pan-American Airlines turned over to the English one of their large Boeing 314 flying boats to be used for official duties between England and Bermuda. Note camouflage.

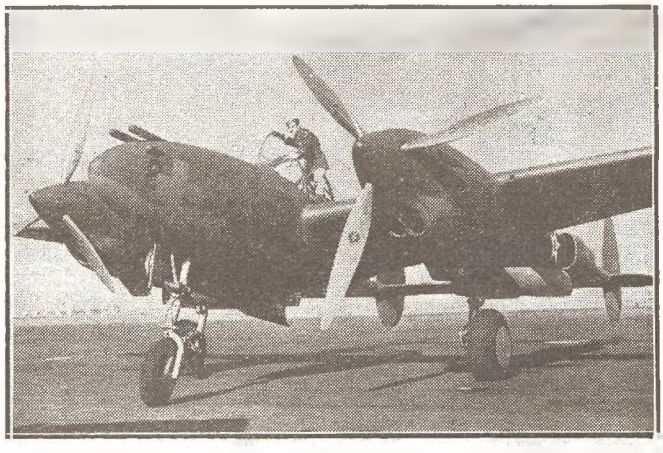
Flying Into Focus



Attractive Harriet Rice inspects Pliofilm shipping bag used by Lycoming. The bag protects engines from moisture.

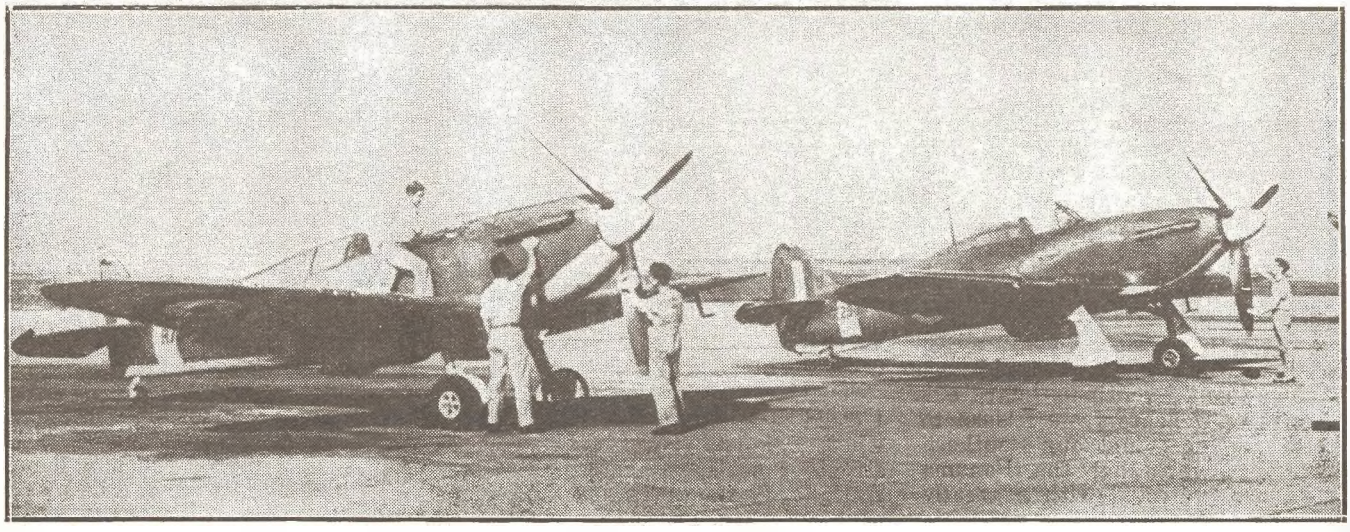


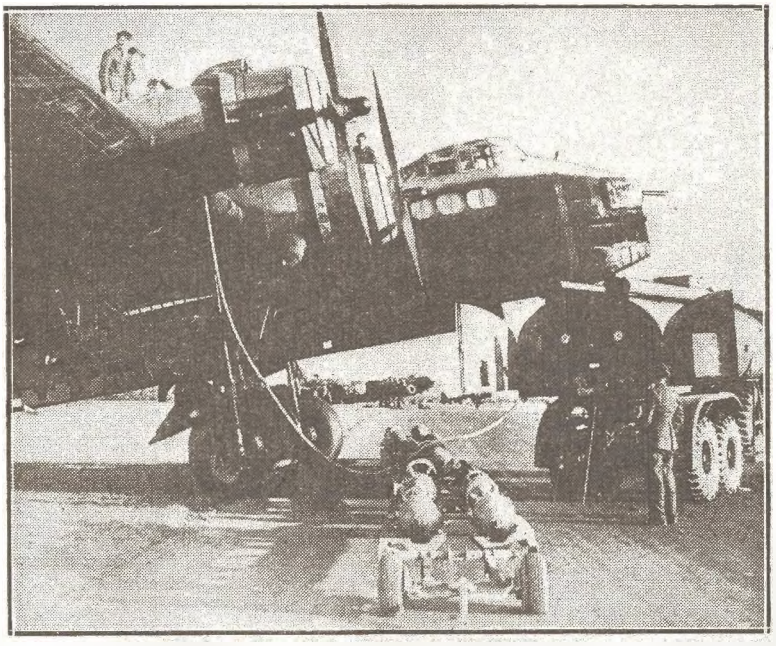
Mass production of U. S. warplanes is depicted in this composite picture. Bell and Curtiss machines are illustrated.



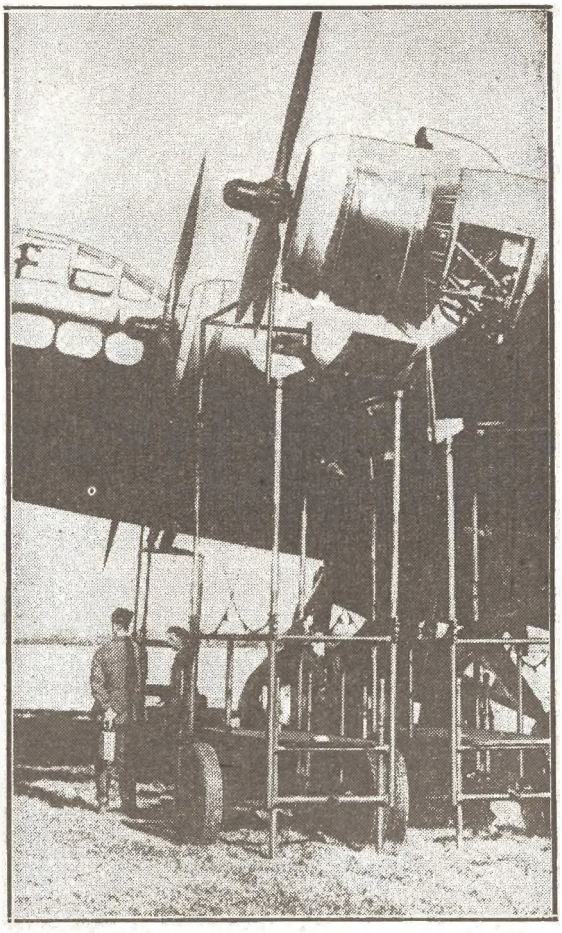
Dramatic nose shot of a Lockheed P-38 fighter on maneuvers. Armament consists of cannon and .50 caliber machine guns.

New Yorkers were recently given a rare treat when these RAF machines were on display at LaGuardia Airport. Both Spitfire and Hurricane had wood propellers.



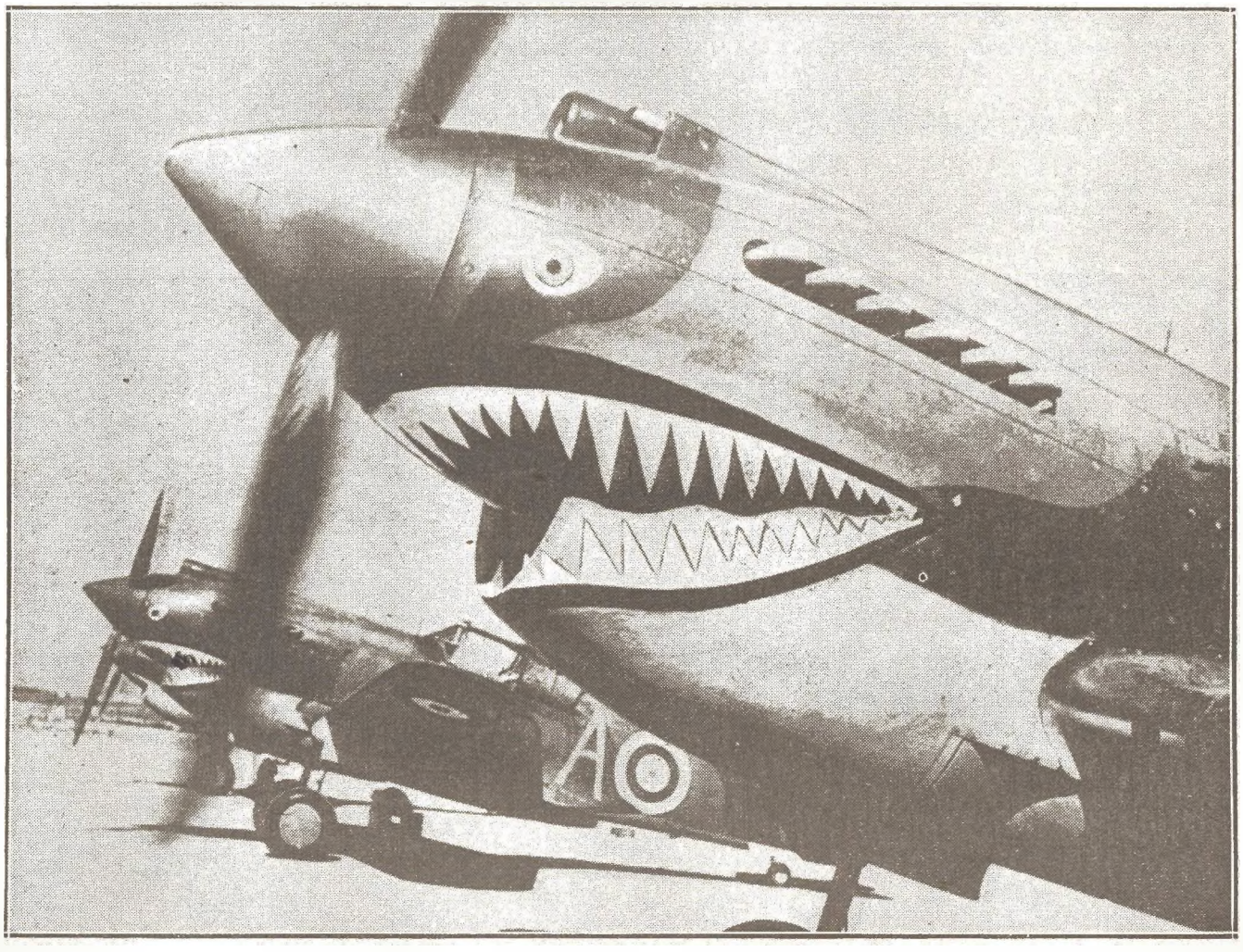


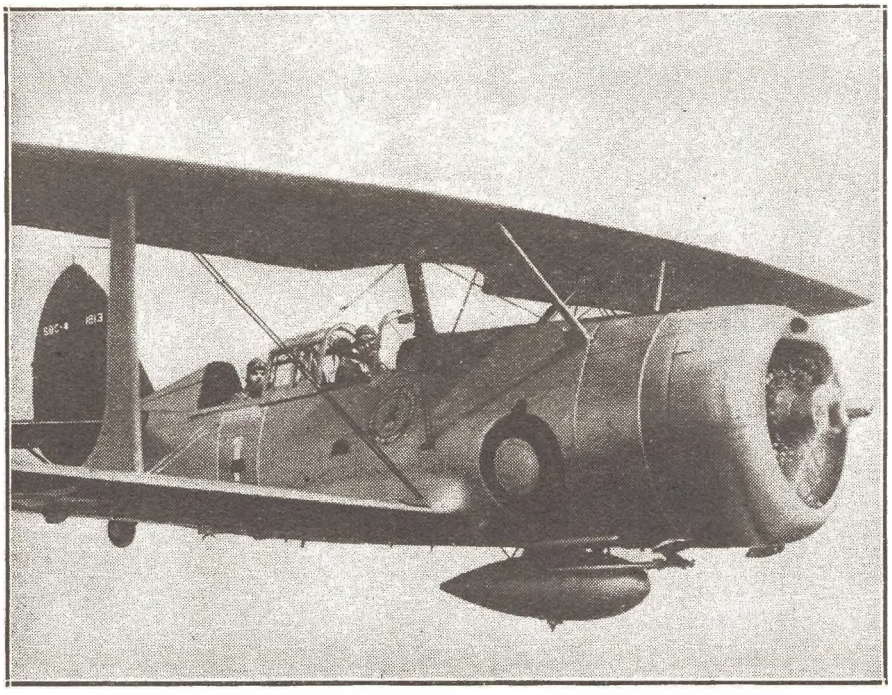
A visit to one of Britain's oldest bombing squadrons which is using one of the newest heavy bombers, the Stirling. The plane has a span of 99 feet and a length of 87 feet. Top speed is rated at more than 300.



Right: To attend to the needs of the Stirling's Bristol Hercules power plants and their D.H. hydromatic propellers, special "gantries" have been devised for the use of RAF crews making repairs or adjustments.

Imagine the feelings of a "poor" Nazi in North Africa as one of these shark-like Curtiss Tomahawk fighters comes blasting down at him! Even with all of their pressed offensives in Libya, the British still had ample time to make this transformation. Maj. Gen. H. H. Arnold says this job is now just a good pursuit trainer.





From the designation on this Curtiss, one can immediately tell that the plane is a scout-bomber built by Curtiss, fourth modification. But if the number-letter system is done away with, a name would give no such data.

WHAT'S IN A NAME?

Our Naval Air Service recently gave so-called "colorful" fighting names to many of its craft for popular use. But this writer believes the designation system to be better.

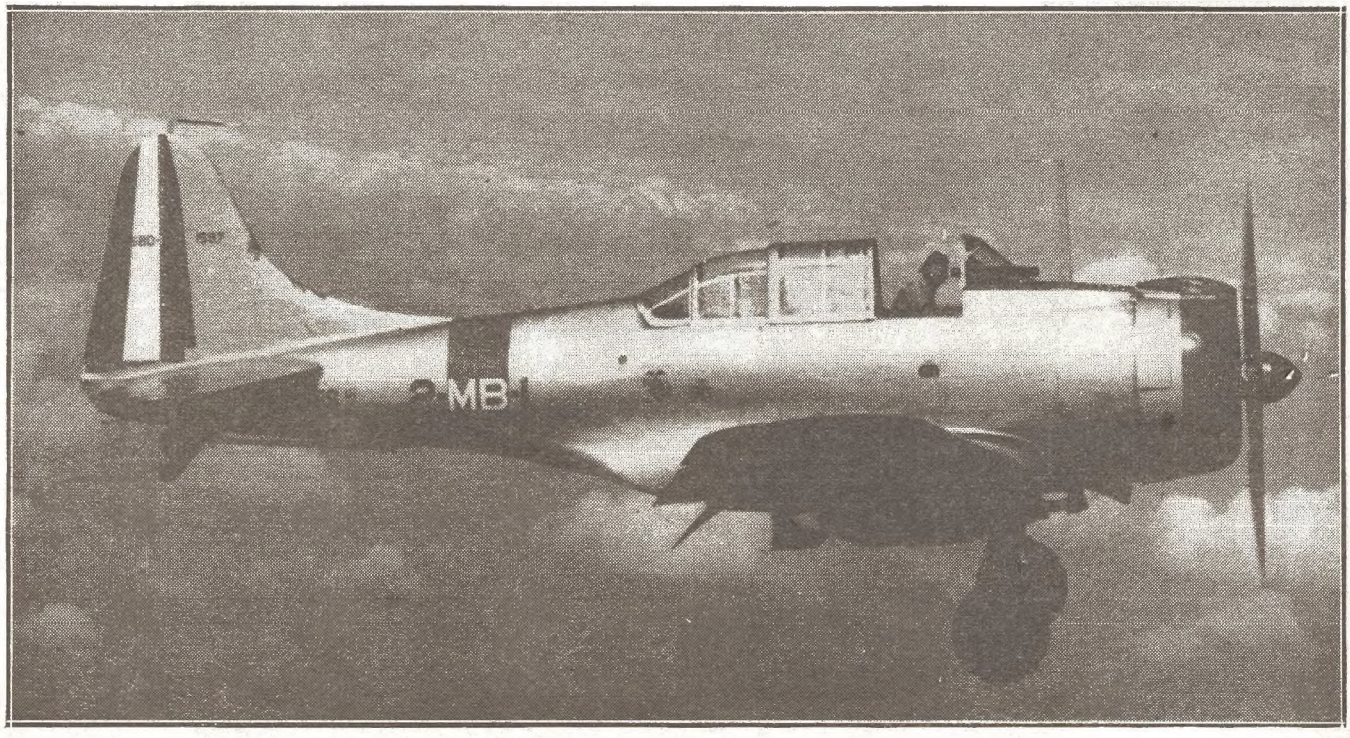
by RAYMOND HERON

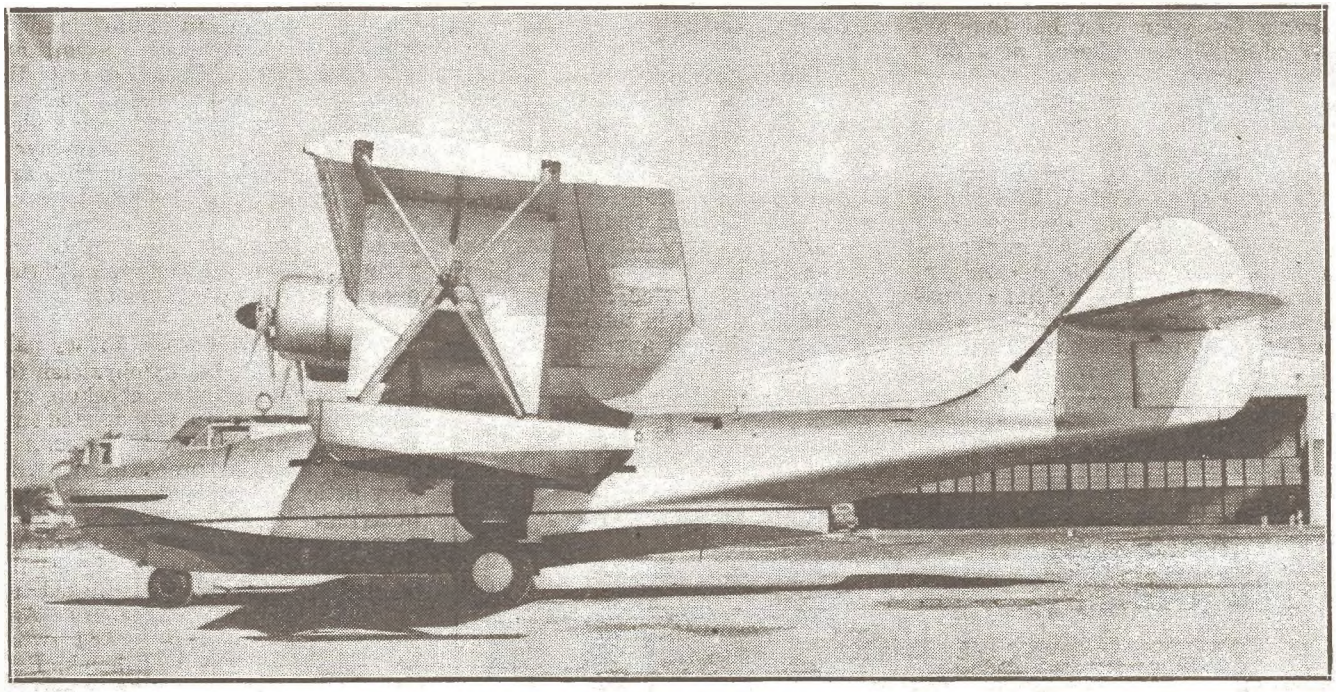
To some, SBD-1 might sound unintelligible. But it is argued here that the Navy's new name for this Douglas, Dauntless, is far more mysterious. From that name, it is impossible to even determine the ship's service duties.

WILL THERE be no end to this let's-be-like-the-RAF business? First came more guns, followed shortly by armor plating. They were good steps, granted, and we aviation writers have been arguing for them for many years. Of course, however, we just *write* about aviation and what we advocate means very little in military circles. But now, this writer believes, just a little too much English is being put on the ball when the Navy Department starts tagging names to our service planes. And there again, this is just a mere writer's opinion; but let this writer make his point clear, and he believes that many readers will agree that Bard Shakespeare knew what he was talking about when he coined the expression, "What's in a name?"

Our Naval Air Service, this writer believes, has the best designation system to be found any place in the world. From a quick glance at a call number, one can immediately tell what type plane the machine in question is, who built the craft, and what model it is of what series. Take the F4F-3, for instance. That designation tells that the plane is a fighter built by Grumman Aircraft; that it is the fourth entirely new type chaser put out by the Bethpage firm, third minor modification on the original design. Call the ship by its new Naval name, Wildcat, and you don't know a blasted thing.

True, to the general public names are more colorful, and, to some extent, easier to remember for the time being. But by the same token, as new models and new types are produced, names of older models and types will continue to mean less and less. After a period of years, one would undoubtedly have nothing more than just a vague recollection of a ship called the Fighting Flunkey or the Gashouse Gazoot. But if the F4B-4 is mentioned





In due time, claim those who advocate the new system, the public will become accustomed to names. But will they remember that the Catalina is the twin-engine Consolidated flying boat and not the PBY-5A amphibian model?

to any aviation enthusiast at any time in the future, it will be indelibly stamped on his mind that the ship was a Boeing fighter and nothing else but.

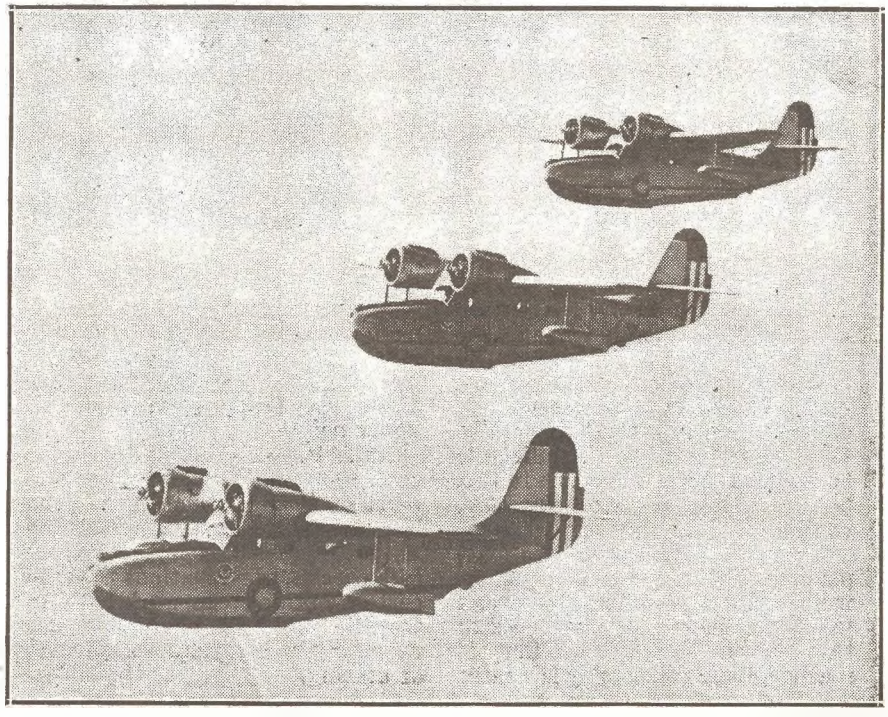
Suppose a new type plane comes out, and also suppose that numbers and letters are dropped completely for identification purposes. If you read, or hear, that this hypothetical new job is called something like Wasp, how in the name of all that's holy will you be able to determine anything else about the machine? Then suppose that instead of just knowing the name, some kind scribe lets you in on a deep dark secret and says that the ship in question was built by Brewster. Do you then, even with this added information, have any way of knowing whether the job is a fighter, a bomber, a patrol-bomber, or an observation machine; and do you know what modification of what model it is, or whether it is an entirely new type? To know the full story in such a case, you will have to be told that the plane is a "Wasp single-seat fighter built by Brewster, being an advanced model of the Hornet." But wouldn't it be infinitely more simple to say, "The new plane is called F5A-3, which is a modification of the F5A-2?" As a matter of fact, even that last explanation would be unnecessary, since the advanced number would immediately tell the complete story.

THE WRITER is not arguing in favor of the Army Air Forces' system of designating planes, far from it. He does, however, believe that the style is better than a name series would be. The designation P-86, if there was such a ship, would at least tell that the plane was a pursuit and that it was possibly ordered after the P-85. However, a reader would be left virtually hanging in mid-air if that type was called Hornblower or any other horrible handle.

In due time, claim those who advocate the new system, the public will become accustomed to names and will remember that the Catalina is the Consolidated two-engine flying boat. But this writer heartily disagrees with that, and he believes that even those in the aviation industry would —say, four years hence—be able to look back and be able to say definitely that the Catalina was a Navy Consolidated PBY-5, and *not* the PBY-5A, The latter, you know, has the same general outlines of the former, but the 5A is an amphibian and not a straight flying boat. Kittyhawk and Airacobra and Buffalo might possibly be in a somewhat different category, because those ships are everyday news and their names are being hammered at the public continuously by newspapers, aviation magazines, and other mediums.

Just take some of our older American planes, for example. You, of course, remember the Jenny and the Helldiver and the Fledgling. But do you remember the Texas Kitten or the Seagull? Those airplanes were

And what about machines in the not-so-popular category? If the present designations are eliminated, a person several years in the future would undoubtedly have a hard time remembering a plane like the Grumman JRF-1



news a few years ago, but they are undoubtedly remembered now only by a very few in the aviation game; and those who do remember them probably had more than a casual interest in the machines or else are aeronautical students of the highest degree. Now think of the R3C-1, F3B-1, and BM-1. Those jobs, too, are now obsolete. And even though you might not immediately recall their general appearances, you do know what companies they were turned out by, what models they were of what series, and what duties they were destined to perform.

An airplane—especially a military airplane—is not a plaything. It is not meant for the general public any more than spats are meant for the military. Instead, it is a tool of war; a hard, mechanical, efficient tool meant for fighting and killing. The military cares very little whether the man-in-the-street knows what he is doing while on service, and the public for the most part is totally disinterested. And since it appears that this whole move of naming planes is somewhat of an idea to make our military machines sound more dashing to the taxpayer, the whole situation approaches something not quite understandable. Our Army and Navy flyers are quite content to go on as they are, using call numbers which to some might be unintelligible, so why try to remove this bit of technicality and pamper the planes for a public that doesn't as a rule give a hoot?

A FEW DAYS ago the author paid a visit to his family physician for a semi-annual physical checkup, and while there we naturally drifted into the subject of aviation. This doctor is just an average practitioner, with very little interest and no experience in flying. Yet he was able to discuss aspects of the P-40, the SB2A-1 and the F2A-2, merely from the odds and ends he had picked up by reading the newspapers. And when your reporter asked what he thought of the Tomahawk, Bermuda, and Buffalo—just as a test—he didn't even know what ships were being referred to!

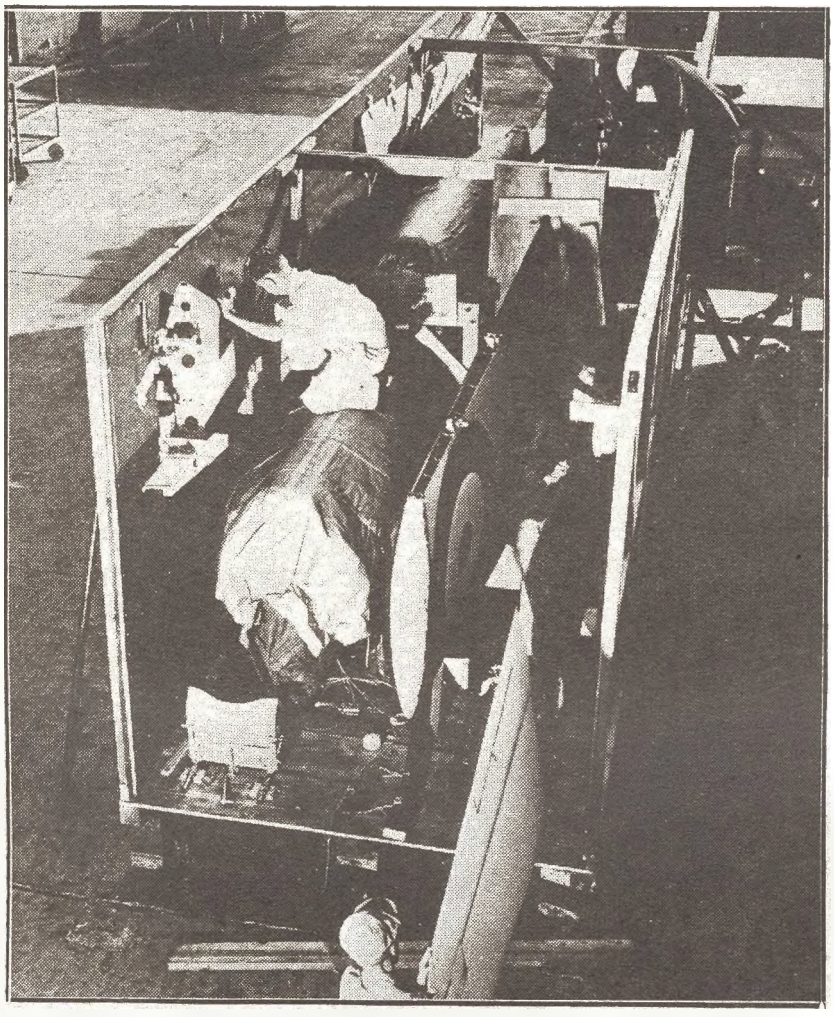
Maybe this experience proves something and maybe it doesn't. It certainly is not a Gallup Poll of Public Opinion, but it does give one man's views on the subject. And remember that this one man was just an *average* disinterested American citizen, sitting on the sidelines and not knowing the difference between a pitot tube and an oleo strut.

Like other trades and professions, aviation has its technicalities, and those technicalities are as much a part of the game as a "Y" joint is part of plumbing. A "Y" joint, to use that parallel, explains exactly what that piece of pipe looks like and how it is formed, and any layman can get a good mental picture of the unit even though he has never seen one. In the same fashion, F5F-1 tells what type that particular ship is and what company constructed it; but Skyrocket, while more colorful, doesn't convey a blasted thing. It sounds more like a pyrotechnic apparatus than a man-made bird of war not meant for colorful aerial display but for the gentle art of killing in the modern way.

Fortunately, the Navy Department has not officially erased the call numbers from our military planes as yet, but has just given them these various names in addition to designations. The writer is not speaking for the entire flying game, he knows, and will probably have many against him; but he believes that many connected both directly and indirectly with aviation will agree that numbers and letters are the better and that there's very little in a name—nothing, in fact, except *just* a name—as far as military aircraft are concerned. And he further believes that if the present number-and-letter designations are deleted completely, we're going to have one devil of a job in the future trying to tell what's what and who built it.

THE END

A Fighting "Bundle for Britain"



WORKMEN "wrap up" a very welcome Bundle for Britain—a Mustang fighter. This scene at the North American Aviation plant is typical of the efficiency with which planes of this type are crated for delivery by ship to the British. The Mustang's horizontal stabilizer is being pushed into its cradle in this picture. Note the slim fuselage, wrapped in heavy paper.

From the factories, crated warplanes are transferred to holds of waiting ships. So scientifically and effectively have they been packed that once the destination is reached, their reassembly is a mere matter of hours for RAF crews.

Wings, control surfaces, empennage surfaces, and propeller are removed from the planes after testing. The wings are then put in position and firmly secured at two stress points.

After two sides are nailed on the case, the small assemblies are fastened on the floors and sides of the box. Before the other sides and the top are fastened, company inspectors check all installations to make certain nothing can work loose in transit. Only 55 man-hours are necessary to complete the process of crating.

AMERICA'S NEWEST ACES

Against Axis forces, American Army and Navy flyers are once again showing the stuff of which they are made. They are carving niches for themselves in the Hall of Fame!

RICKENBACKER, Luke, Vaughn, Kindley, Springs—America was proud of those five top-ranking aerial heroes of the first World War who accounted officially for 80 enemy aircraft. Now, however, even their great deeds of daring in the war-torn skies over France are being pushed into the background by the marvelous showing Yank pilots are making against the aerial armada of Japanese Emperor Hirohito.

This new era of battling in the skies is much different from the 1914-1918 days. Then, from one to two guns were standard equipment on single-seat fighters; now, modern machines carry as many as 12 machine guns, or a multiple arrangement of guns and cannon. But the individual is much the same, having that same burning desire to right a wrong, to thrust back an enemy who struck without warning. American pilots are again showing the stuff of which they are made!

Beginning with this issue, FLYING ACES will present monthly a section devoted to the exploits of these new American heroes.

Capt. Colin P. Kelly, Jr.

At this writing, Captain Kelly's name heads the list of America's roll of honor. It was he who hurled an Army plane down into the blazing muzzles of Japanese guns and, dumping his deadly cargo of bombs at suicidal range, dealt a mortal blow to the 29,000-ton Japanese battleship *Haruna*. Three of his bombs made direct hits on the battleship and sent it to the bottom north of Luzon, in the Philippines.

Kelly, 26 years old, dived to victory and to death in the tornado of gunfire raging over the *Haruna* before the big battle wagon went down to give the Allies their first resounding success of the war. Observers say that Kelly stood his plane on its nose and dived at an almost vertical angle at the battleship, as anti-aircraft shells burst around him furiously. When his bombs struck, the resulting explosion was so tremendous that the Captain literally "disappeared." He was so determined to make good on the mission that he sacrificed his life!

Capt. Colin P. Kelly, Jr., heads the list of U. S. heroes. He gave his own life to sink a Japanese battleship.

Lieut. Boyd D. Wagner

When the alarm sounded that Japanese planes and landing forces were approaching Appari, on the northern coast of Luzon, Lieutenant Wagner lifted his plane from an Army field near Manila and rocketed toward the invasion point.

Half a dozen Japanese warplanes challenged Wagner and two went down under his guns after a brief fight. He then continued to the enemy landing field and, hedge hopping, pumped hot ammunition into hostile planes on the ground. When he eventually returned to his base because of low fuel, a total of 12 grounded Jap planes had been completely wrecked. That's a total of 14 on one flight!

On a later flight, U.S. pilots led by Wagner blasted out a nest of 26 Japanese planes at Vigan, more than 200 miles northwest of Manila. Credit for the attack's success was given mainly to Lieutenant Wagner. At this writing he has already shot down five Jap planes in combat and destroyed numerous others on the ground. This makes him the first American to rate the title of Ace.

Lieut. George S. Welch

In the Honolulu fighting of December 7, it was announced that 41 Japanese planes were destroyed. And Lieutenant Welch, of Wilmington, Del., is credited with downing four of these. For this action, which the War Department described as "magnificent," Welch was presented with the Distinguished Service Cross on December 16, for "outstanding acts of heroism during the attack on Oahu"

The citation said that Lieutenant Welch, when surprised by the heavy Japanese air attack, sped by automobile ten miles to the point where the planes of his squadron were stationed and took-off immediately. Over Barbers Point, west of Honolulu, "he observed a formation of approximately 12 planes about 1,000 feet below and about ten miles away," the citation added. "He immediately attacked this enemy formation and downed an enemy dive-bomber with one burst."

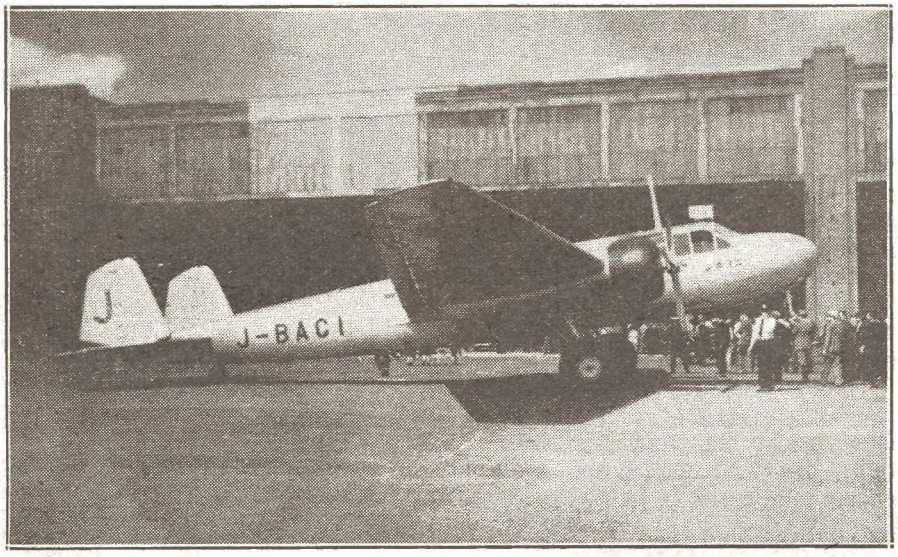
Lieutenant Welch, who attacked a squadron of approximately 12 Japanese planes over Honolulu and brought down one dive-bomber.

Lieut. C. A. Keller

To this Naval flyer went the tribute of spotting and shadowing a 29,000-ton Japanese battleship of the *Kongo* class, weaving and ducking through a deadly barrage of enemy defensive fire.

But regardless of danger and Japanese A-A, Keller held on until Lieut. Comdr. J. V. Peterson arrived with dive-bombers and hammered

(Continued on page 71)



Evolved from the Junkers Ju. 86k, the Mitsubishi 96 is listed as a long-range medium bomber. Engines used are 700-h.p. Kawasakis.

Review of Japanese Warplanes

This summary includes all military machines seeing service with the Japanese air forces.

by

William Herbert Randall

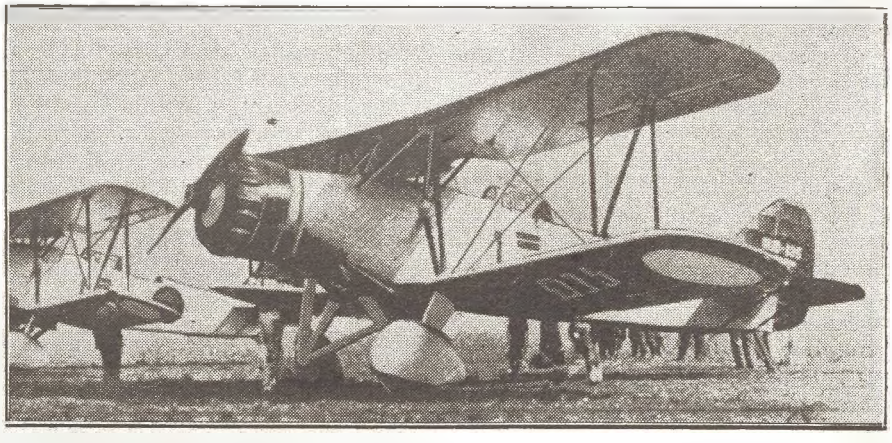
BECAUSE of length of supply lines and lack of adequate landing areas or bases for troops in enemy territory, this war with Japan will in all probability be a war of naval and air fleets. Japan, at the outset, had the initial advantage of surprise and was successful in destroying many of our Army and Navy airplanes and sinking and damaging a portion of our fleet at Pearl Harbor. But that was only the beginning, and as this is being written America has settled down to the grim task of fighting the long and hard path to victory.

Japan would be exceptionally vulnerable to our bombing planes, and the Tojo government would probably be forced to sue for peace shortly in such a case. But the fact remains that we do not have bases within range of Japan from which to dispatch our bombers. The only suitable facilities are to be found at Vladivostok, but the Russians at this time have not even offered us the use of that base. And if they continue to respect their non-aggression pact with Japan, this war will in all probability settle down to one of naval action, with our air forces being used only to beat off Japanese attacks launched from Formosa or the Marshall Islands far out in the Pacific. American aircraft carriers might be put into use, true, but this would probably prove to be a costly action because of Japan's strong surface and submarine fleets which would intercept them.

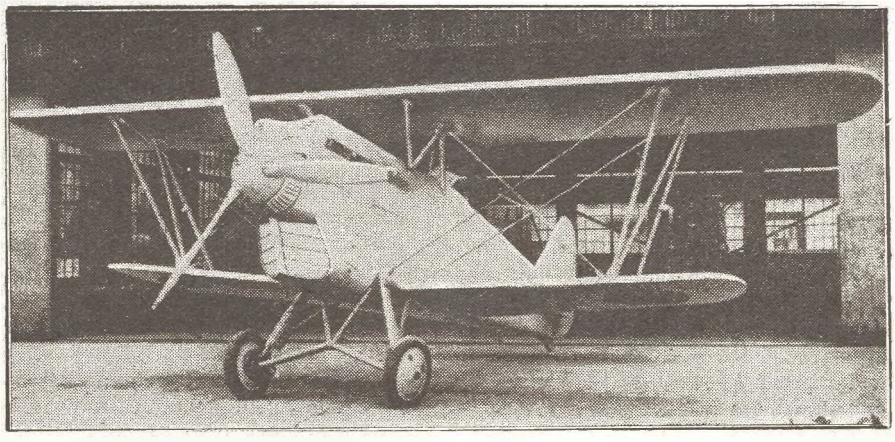
In any event, with our country up to the ears in an all-out effort to prosecute the war to victory, it is interesting to now summarize the Japanese air force to see how that country's planes chalk up against American types.

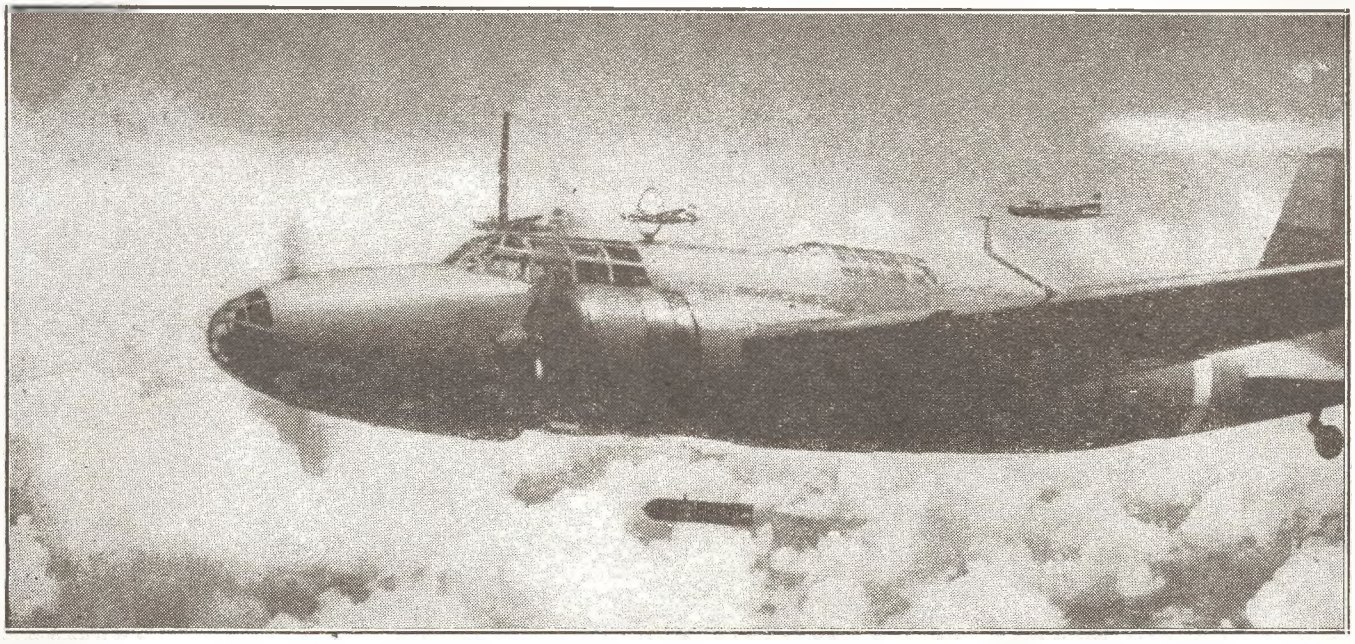
Japan divides her forces into two separate air arms, one Military and one Naval. The total number of aircraft available to these two arms are believed to number less than 5,000. Seven Army and Navy flying schools graduate less than 1,000 pilots annually; and as even the Japanese admit their accident rate to be higher than that of any other power, even in peacetime, it would seem that a wartime emergency would find them extremely short on pilots.

The Military Air Force and Military Aerial Supply headquarters are at Tokyo, with supply and operating bases located throughout the Empire. The Military Air Force is divided into from 14 to 18 air regiments based at the leading military air fields of Ainei, Kagamigahara, Ake-



Mitsubishi's 96 torpedo-bomber is almost a direct copy of the Blackburn Shark. Power is supplied by a British-designed power plant. Below: Of ancient vintage, the Curtiss Hawk-like Kawasaki 95 is now classified as a second-line fighter.





One of the latest and most modern of Japanese long-range bombardment types is the Nakajima 19. It uses two 870-h.p. Mitsubishi twin-row engines and has a top speed in excess of 250.

nohara, Kagi, Takorazawa, Hamamatsu, Kumagaya, Shimoshizu, Heijo, Osaka, Yokkaichi, Uyeda, Heitogai, Tachiarai, and Tachikawa, with one balloon regiment located in Chiba.

The headquarters of the Naval Air Force are also located at Tokyo, with stations and bases throughout the islands and possessions. The Aircraft Battle Force is divided into three fleets, each under an Air Command with the rank of Rear Admiral. Imperial Navy Aircraft Carriers *Rujyo, Soryu, Hiryu, Hosho, Akagi, Kaga,* and *Koryu* base a total of less than 250 aircraft. Three transports, the *Kamoi, Chitose,* and *Notoro* are equipped with catapults for launching their seaplanes. Fourteen battleships of the Imperial Japanese Navy carry from two to four aircraft each for observation and scouting, while 43 cruisers serve as bases for from one to four aircraft each.

On the underside of the wing panels of all Japanese aircraft is emblazoned the red ball significant of the Rising Sun Emblem of Japan. There are no tail markings for Japanese Military aircraft. Squadron markings appear on the fuselage sides.

In the following summation of Japanese military and naval aircraft, one point stands out—that is, many of the planes and engines are obsolete by at least three years in comparison with other world military craft. Not one of the Japanese engines has attained a thousand horse power rating, and all are versions of foreign types. A further point becomes obvious through closer study. Nearly all types of aircraft have also been copied from some foreign design of several years back. Yet, in studying the specifications of the Japanese version and those of the original model, it would seem that a poor job of copying had been done. The Japanese versions in nearly all cases fail completely to match those of the original in performance.

The following listed aircraft comprise all of those craft detailed to the air forces of the Japanese army and navy.

Training Planes

MILITARY and Naval Training Section planes are light, two-place, single-engine types. No twin-engine trainers are used, as most advanced types of instruction are received with actual squadron duty. This fact may account for the high accident rate.

95-1 TATIKAWA two-place advanced biplane. Type 95 350 horse power 9-cylinder air-cooled radial.

95-3 TATIKAWA two-place basic biplane. Type 95 150 horse power 7-cylinder air-cooled radial.

R-38 TATIKAWA two-place parasol primary monoplane. Jimpu VI 180 horse power 7-cylinder air-cooled radial.

R-5 TATIKAWA two-place primary biplane. Cirrus Hermes IV 130 horse power air-cooled inverted 4-in-line.

AIBA8 TOKYO KOKU KABUSIKI KAISHA two-place advanced biplane. Toky Jimpu 130 horse power 7-cylinder air-cooled radial.

Fighting Machines

FROM ALL available information, Japan seems to have only four separate types of fighters. All of these are single engine, single-seat types. The Nakajima 97 is the only fighter that comes anywhere near to being modern, and no information is available as to its power. The following listed planes comprise the known fighter force of the Japanese Empire.

96 MITSUBISHI low-wing monoplane with fixed landing gear. Mitsubishi Kinsei 900 horse power 14-cylinder air-cooled twin-row radial.

97 NAKAJIMA low-wing monoplane. No data available on engine.

A.N.1 NAKAJIMA low-wing monoplane. Nakajima III (Wright Cyclone) 550 horse power 9-cylinder air-cooled radial.

95 KAWASAKI biplane. Kawasaki (B.M.W.) 700 horse power liquid-cooled inverted V-12. This plane is a version of the old Curtiss Hawk.

Bombing Aircraft

ALL Japanese bombers fall into the medium classification, and all seem under-powered.

93 KAWASAKI two-place day bomber. Kawasaki (B.M.W.) 700 horse power liquid-cooled inverted V-12 or Bristol Jupiter.

Soyokazi MITSUBISHI three to five-place mid-wing long-range monoplane. Two Mitsubishi Kinsei 900 horse power 14-cylinder air-cooled twin-row radials.

96 MITSUBISHI mid-wing monoplane. Two Kawasaki (B.M.W.) 700 horse power 9-cylinder air-cooled radials.

19 NAKAJIMA mid-wing long-range monoplane. Two Mitsubishi Type IV 870 horse power 14-cylinder air-cooled twin-row radials.

Reconnaissance Types

JAPANESE Military forces have only two models of reconnaissance craft and one combination reconnaissance-fighter type.

MK-11 Karigane MITSUBISHI two-place low-wing reconnaissance-fighter monoplane. Mitsubishi A-14 800 horse power 14-cylinder air-cooled twin-row radial.

Hato MITSUBISHI two-place biplane. Nakajima III (Wright Cyclone) 550 horse power 9-cylinder air-cooled radial.

94 NAKAJIMA two-place biplane. Nakajima III (Wright Cyclone)

(Continued on page 80)

John K. Northrop

Jack Northrop Scores Again!

Great strides have been made in aviation, but designs have remained almost static. At last, however, a really different type has been built.

by Joseph M. Friedland

IN the mad scramble to produce harder-hitting and faster fighter planes to assure for ourselves, as well as our allies, a superior airpower, little time, it seems, would be found to experiment with unconventional type aircraft. Fact is, however, that the time *was* found and the experiment was a success!

Of the thirteen years in which experiments on the Northrop Flying Wing have been conducted, actual success on a truly all-wing machine has been attained only during the past eighteen months. The secrecy surrounding this craft during this time was probably the most carefully guarded one ever entrusted to the engineering and flight testing staff. Somehow, as with most all secrets, news of Patent Design No. 127.185 as this machine is listed in the U. S. Patent Office, leaked out and made the front pages, even though a bit obscure in the size of its report. The design, filed by its inventor John K. Northrop, immediately felt the protecting arm of the Air Corps, which "sat" on the story. Rather than subject the fantastic-looking machine to a lot of typical newspaper guesswork accounts and exaggerated description, Army officials decided that a brief announcement be made public to prevent such reaction. And now it may be told, so to speak.

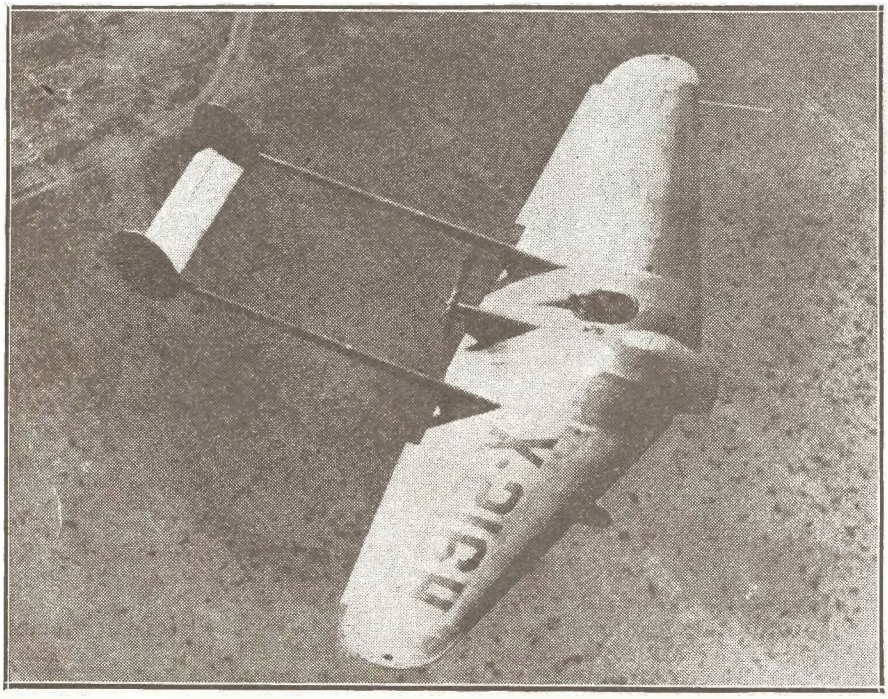
The development of the Flying Wing goes back to the Summer of 1928 when, with the view to carrying on research in the field of all-wing aircraft, Northrop formed a small research group. They built and tested a flying-wing airplane which housed the pilot and power plant within the contours of its wing. The ship made numerous flights in 1929 and 1930, but the restricted financial conditions of the early 'thirties forced the abandonment of the project.

In 1939, when the present Northrop Aircraft Company was formed, the organization began manufacturing N3-PB type torpedo seaplanes for the Norwegian government. In the two years since its formation the organization has received more than $75,000,000 worth of business and has stepped-up its personnel to the 3,000-mark. It is rapidly becoming one of the major aircraft companies in the United States.

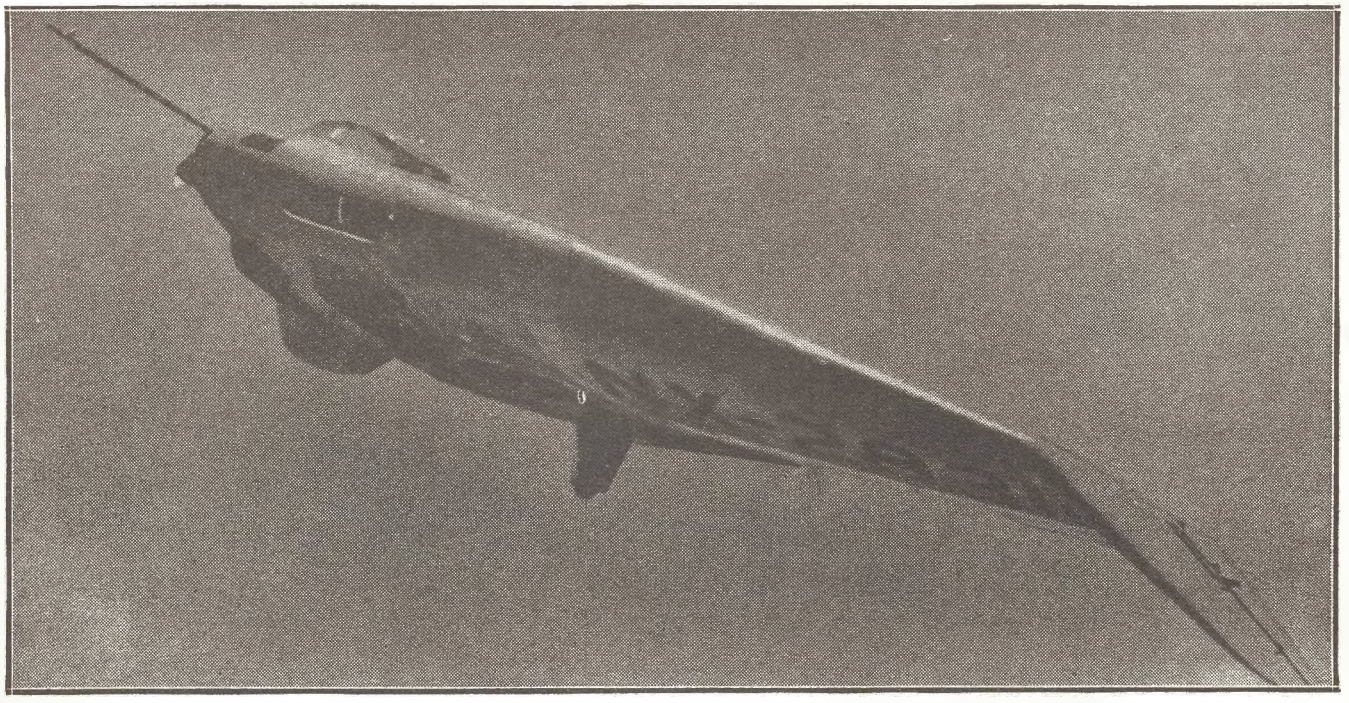
The first project undertaken after the company was organized was the design and construction of the Northrop Wing, which was first flown by the famous test pilot Vance Breese in July, 1940. Since then it has been their most active research project. A wind tunnel testing program was undertaken at the California Institute of Technology and also in Northrop's own wind tunnel. Special tests have been run at the NACA laboratories at Langley Field, under the direction of the Army Air Corps.

Tht first Flying Mock-up was flown more than 200 times during the past year; and based on the performance of this radically new type of machine, Jack Northrop predicted that substantial increases in range, speed, and economy in production and operation would be obtained in the very near future.

The Northrop Flying Wing of 1929 was a radical craft, but it was not actually a true flying wing. Note how the pilot was located in an off-center position.



POTENTIALITIES of the Wing seem to be unlimited. Except for its propeller shaft housings, every square inch of the plane's body increases the lift of the wing. The Flying Mock-up has a span of 38 feet, minus tail or fuselage, and carries two six-cylinder Franklin engines within its wings. Wind resistance is to a great extent thus eliminated. Its 120-h.p. engines drive three-bladed propellers mounted on ten-foot extension shafts. Concerning the handling characteristics of the plane, the company's test pilot, Move Stevens, said: "The feel of the ship is exactly like that of a conventional air-



Except for its propeller shaft housings, every square inch of the plane's body increases the lift of the wing. Two 120-h.p. Franklin engines drive three-bladed pusher airscrews.

plane and it is as easily handled and maneuvered." The landing gear is of tricycle type with the main wheels at the rear; the tread is nine feet.

How the Wing maintains its stability is a feature which Northrop officials are reluctant to reveal. However, hundreds of flights have demonstrated that this design is entirely normal as to both stability and control about all three axes. The odd-looking conformation of the wing, with its drooped tips, has been based upon both engineering analyses and extensive wind tunnel and full-scale testing. Test flights were conducted with the wing tips in all possible positions, and the present arrangement has been found to be most aerodynamically efficient.

Control of the Wing is achieved through the use of a system of "elevons" and wing tip rudders. The "elevons" serve, as in other tailless planes, as both elevators and ailerons. Rudder action is provided by control surfaces incorporated in the drooping wing tips.

The wing of the machine is nearly four-feet thick near the leading edge. The cathedraled wing tips make up for the lack of a vertical stabilizer. Control and stability are obtained through the shape of the wing rather than by use of external fins and rudders. Some advantages of the tailless craft are:

Having considerably less drag than the conventional plane, the Northrop Wing would require considerably less horse power to attain comparative speeds and could achieve much higher speeds with the same engine power used in the orthodox machine. Previous ideas of flying wings, the basic conception of which is as old as the art of flying itself, have led one to assume that such a craft would necessarily have to be of huge proportions so that all the contents of a conventional ship could be housed in its wing. The Northrop design, however, if applied to a passenger transport—say a Lockheed Lodestar or Douglas DC-3 type—would have a wing thickness of only seven to eight feet, which would be ample room for the housing of passengers, crew, and cargo. The structural simplicity and added space for the cargo, passengers, etc., would, in the opinion of Northrop officials, more than justify the adaptation of the Wing design.

Mr. Northrop stated that transport aircraft having cruising speeds of approximately 100 m.p.h. greater than the best ships now available can be built as soon as the necessary engineering on the Flying Wing can be completed and construction facilities made available. He went on to say that: "The usefulness and economic value of aircraft may be doubled and even trebled through our complete vindication of the flying wing principle. Unquestionably, the way is paved for rapid and startling new developments in American aeronautics which will be a far-reaching significance to the world."

Although the concept of the flying wing design is not new, to Jack Northrop and his staff of co-workers belongs the full credit for developing to a successful stage the first tailless aircraft. Scores of aeronautical engineers in Britain, France, Germany, and Russia, as well as other American aircraft engineers, have spent years working toward the same objective. None, however, were as successful as Northrop in so completely eliminating parasitic drag. Northrop engineers believe they have succeeded in overcoming the complex aerodynamic problems involved in this radical departure from present trends.

AS A military ship, the Wing would, in the opinion of experts, be the most deadly fighter or bomber ever developed. It has been estimated that such a plane powered with two radial or in-line engines of 1,600 h.p. could exceed 500 m.p.h., climb almost straight up, and generally out-fly the best pursuit ship. No mention has been made of its military possibilities by the War Department as yet. But it is known that the Air Corps has displayed considerable interest in this project through their active collaboration which has greatly accelerated its progress. Because military secrecy dictates such a policy, Northrop officials have refrained from releasing any performance figures or details of construction and controlling devices of the Flying Mock-up. However, since the company is at present concentrating its full engineering and construction facilities on military orders, it is doubtful that this new design will be applied to commercial transports until the present national emergency is over.

Jack Northrop has long been associated with experimental and practical aviation manufacturing. Born in 1895 in Newark, N. J., he moved to California with his parents when he was nine years old. In 1916 he obtained his first job in aviation as a draftsman with the Loughead Brothers, who were then engaged in building a twin-engine flying boat. He served in the Infantry and later in the Signal Corps at Kelly Field during the war period and was later recalled to Santa Barbara where Loughead had a contract for Navy Department flying boats.

In 1923 he went to work for Douglas Aircraft, where he served four years in the engineering department, his first job being on the Douglas

(Continued on page 79)

In the Slipstream

America! Win With Wings!

—More emphatically than ever, that's the ticket today. For aviation's smashing power can no longer be denied. Cold facts have demonstrated that control of the air is the answer in modern warfare. It was mastery of the skies that saved Dunkirk, then England. And it was the lack of it that spelled defeat at Crete, lost Britain her *Prince of Wales* and *Repulse*, and had us reeling at Pearl Harbor. Yes, the navy graybeards have finally got it through their nobs that *planes can sink battleships!*

Going To Be Different

As of November 28, we had hardly more than 800 warplanes ready for action outside the continental U.S. That was the figure revealed by General Arnold himself. But, Graham, it's going to be plenty different now, for lots of things have happened since November 28! But decidedly!

Shock

We're told how certain voyagers arriving in Honolulu one day last month were pleased, just as their liner docked, to be treated to a striking aero display by our flyers. Only—it suddenly developed that those airmen weren't *our* flyers! The liner, you see, had made the mistake of getting into port on the morning of December 7!

Hex On Hee-ay-ee

Here's a prophecy: The Jap battlewagon *Hiei* is going to be sunk one of these fine days by air action. We're "concentrating" on that ship just because it's name *Hiei*—pronounced *Hee-ay-ee*—"gets" us. Goofy thing sounds like a college cheer, only we think the cheer is going to be for our side! Anyhow, watch for this Jap boat's doom in the aero news and see if we aren't psychic or sumpn'.

Over Here

Curtiss figures that the Packard-made Rolls Royce Merlin is "the best liquid-cooled motor being built for American military aircraft." It's pointed out that the Merlin P-40 is 15 m.p.h. speedier than the Allison V-12 P-40. And that's not drag! . . . Allison, meanwhile, is working away on its new double-bank engine which it hopes will develop better than 2,000 horses. . . . Before December 7, you'd see flocks of finished planes outside the California factories awaiting delivery—but you won't see 'em there now! They are all flown away the same hour they're finished so no Nipponese can take a nip at 'em. . . . Half a dozen U.S. Maritime Commission ships were being converted into aircraft carriers before we got into the scrap, and you can figure on more than that now. . . . Completion of that chain of airfields from the States to Alaska has forged a telling link in the victory drive against Japan. . . . When bombs banged Pearl Harbor, a single code word flashed to pilots of PAA'S Pacific clippers set 'em all flying on a special war emergency plan.

Over There

They should pin a *Pour le Confusion* medal on Joe Goebbels. A couple of months ago, he was telling us that the Bolo air force had been battered into so many small piles of rubbish. But now he's suddenly conceded that Stalin still has 15,000 fighting planes. . . . The world's best bomber, according to Moore-Brabazon, England's Minister of Aircraft Production, is Britain's Manchester job. . . . As of late October, total RAF casualties for the war were figured to be 16,579. . . . Seems that some of Britain's planes are being furnished by—the Axis! A late report tells of a squadron of Stukas being flown over and surrendered to the Libyan British by a batch of Musso's airmen. . . . And they say another hundred craft have been contributed by French Tunisia skymen who've now decided De Gaulle has the right idea and that Petain is leaning too much toward Hitler and his "new order" policies.

Pause For a Grin

In New York City's first sky-raid alert, one gal excitedly raised her umbrella. Some defense, what? . . . Here's a sad story revealed after the relief of Tobruk was lifted: Just when the besieged Australians finally got their amateur orchestra going, a heel of a Jerry flyer came along and dropped a bomb smack through their bass drum! . . . We credit Joe Crane, of the parachuters association, for the wackiest bail-out we ever heard of. He tells how Otto Hoover, back in 1930 at the Tampa Fair, landed on top of—an elephant! . . . How far can frogs hop? Well, the answer's 4,000 miles, for the other day a slew of 'em hopped by air from Chicago to London, where they'll be used in medical work. . . . Bill Dubusker, of Republic, has the best idea since daylight saving. He'd move all thermometer tubes up an inch in the Fall and down an inch in the Spring—to take the bite out of Winter and the sweat out of Summer.

"Rocket" Jobs Coming

You can look for something pretty striking in rocket-propulsion planes before this world battle is over. The British successfully flew such a craft a couple of years ago after acquiring a workable "kicker" via Yank Inventor Elman B. Myers. And now inside reports have it that they've neatly perfected the plant. Meantime, Mussolini's engineer, Signor Campini, has had a similar job buzzing around Italy. What's more, we understand that the aforesaid Mr. Myers is now furnishing the U.S. with one of these *swoo-oo-oosh* engines. Anyhow, a warplane fitted with such auxiliary power could flash great bursts of speed in fighting maneuvers—just when that speed would count.

Brief About Pilots

Lieut. Boyd Wagner, of Johnstown, Pa., who shot down two Japs and flamed five on the ground at Aparri, Luzon, is one of our old F.A. readers. . . . *Lieut. Chesley Peterson*, of Santaquin, Utah, now leads the First American Eagle Squadron. He holds the D.F.C.—Remember *Umberto Nobile*, the Italian dirigible-flying polar explorer? Well, Chicago is where he now hangs his hat. . . . *Michel Detroyat*, famed French speedster, who ran away with our Thompson Trophy some years back, was expected to die after a bad spill from his bike in a Paris blackout late in November. But he's now recovered. . . . *Lieut. Tom Pace*, hailed as about the top scrapper in the RAF, has been reported missing in action.

New Stuff

Did you see, in the recent news reels, that neat "jungle gym" arrangement they have at Fort Benning for putting parachute troopers into top condition? It's really something. . . . A new type of "Molotov Breadbasket" has been devised by Dave Roby, of Denver—an aerial bomb that'll scatter 80 smaller bombs over a four-mile circle. . . . Stalin has been using planes so heavily armored that bullets are said to bounce off 'em. The Heinies call these jobs "flying tanks." . . . A special A-A shell with parachute-carrying grappling hooks to snag and drag down e.a. (enemy aircraft) has been invented by G. Neumann and F. Schneider, of Milwaukee. . . . Rudy Gebauer, of Berlin, Germany, has brought out a novel altimeter which works by cosmic rays. . . . You've seen smoke rings blown from a cardboard box with a small hole in one side? Well, Dr. L. Chubb, of Westinghouse, has an idea that a big air-blower featuring this principle on a large scale might be used to foul and bring down low-flying planes.

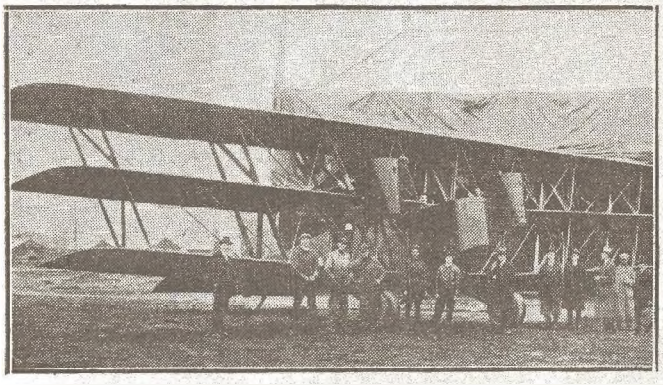
Thisa and Thata

Booting out of the Neutrality Act means PAA will again fly direct to Ireland. . . . Archeological note: Blasts by Nazi bombs have revealed bits of old Romas ruins in London. . . . Vultee and Consolidated have consolidated. . . . France hopes to complete four 6-engined flying boats this year for Atlantic service after the war. . . . They say that in a vain attempt to keep going, Condor, last Nazi airline in S.A., offered to pay 20 bucks a gallon for gas—but didn't get it. Phew! . . . Republic's P-47 Thunderbolt pursuit actually weighs more than the old Ford Tri-Motor.

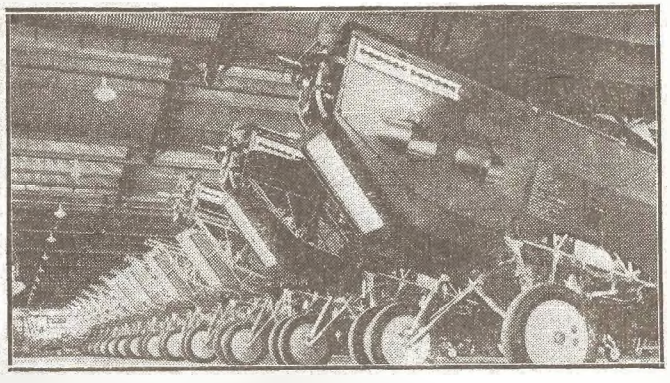
THE END

Here's a rare one for your scrapbooks. The Boeing B-9 heavy bomber was normally fitted with radial engines, but this one—the Y1B-9—used Curtiss Conqueror in-line plants. Note long, pencil-like fuselage and landing gear retraction system.

Down Memory's Runway

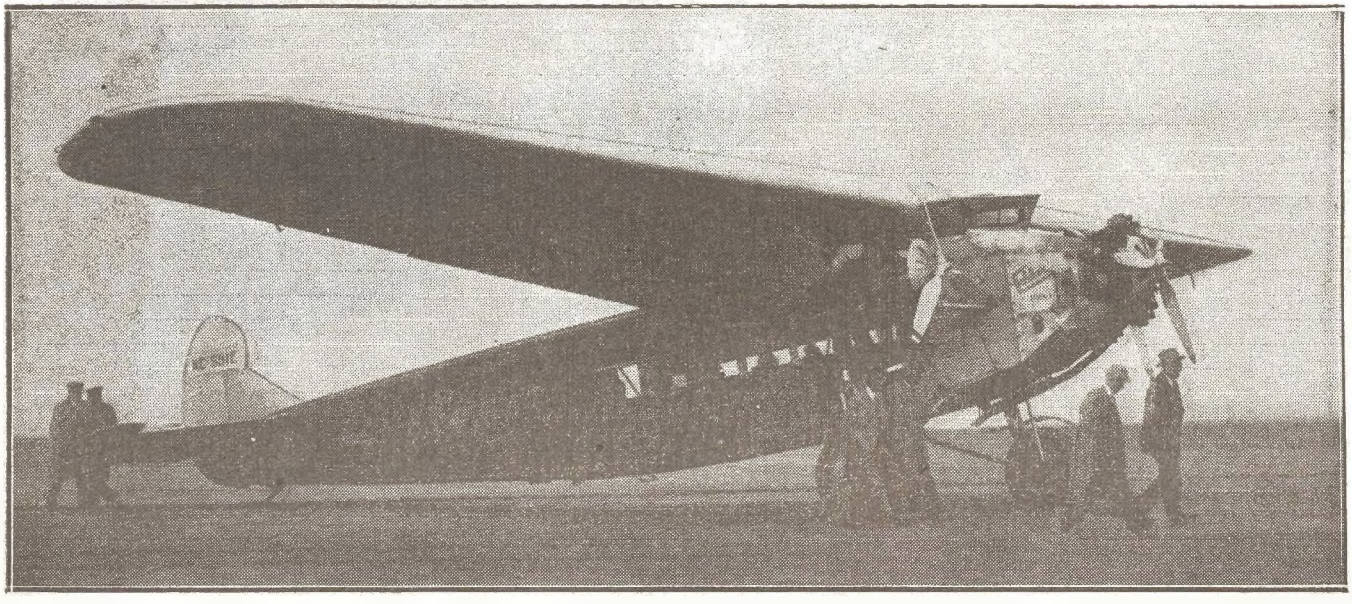


Giant G.A.X. triplane, ten of which were built by Boeing in 1921. Heavily armored, the machines were designed by Army Air Corps engineers. Liberty motors were used.



The Douglas 0-25A observation machine was very popular in 1930 and large numbers were built. Construction was tubing with fabric covering; engines were Curtiss D-12's.

When compared to modern transports, the Super Trimotor Fokker F-10-A is much outmoded. In its day, however, the plane was tops. Arrangements were for 12 passengers and a crew of two. As with other Fokkers, spars were solid spruce.



Flight of the Dead

There was no way in, and there was no way out. But still, the Barton Aircraft plant had been sabotaged beyond repair—the work of a man who had been killed months before!

by Donald E. Keyhoe

CHAPTER I

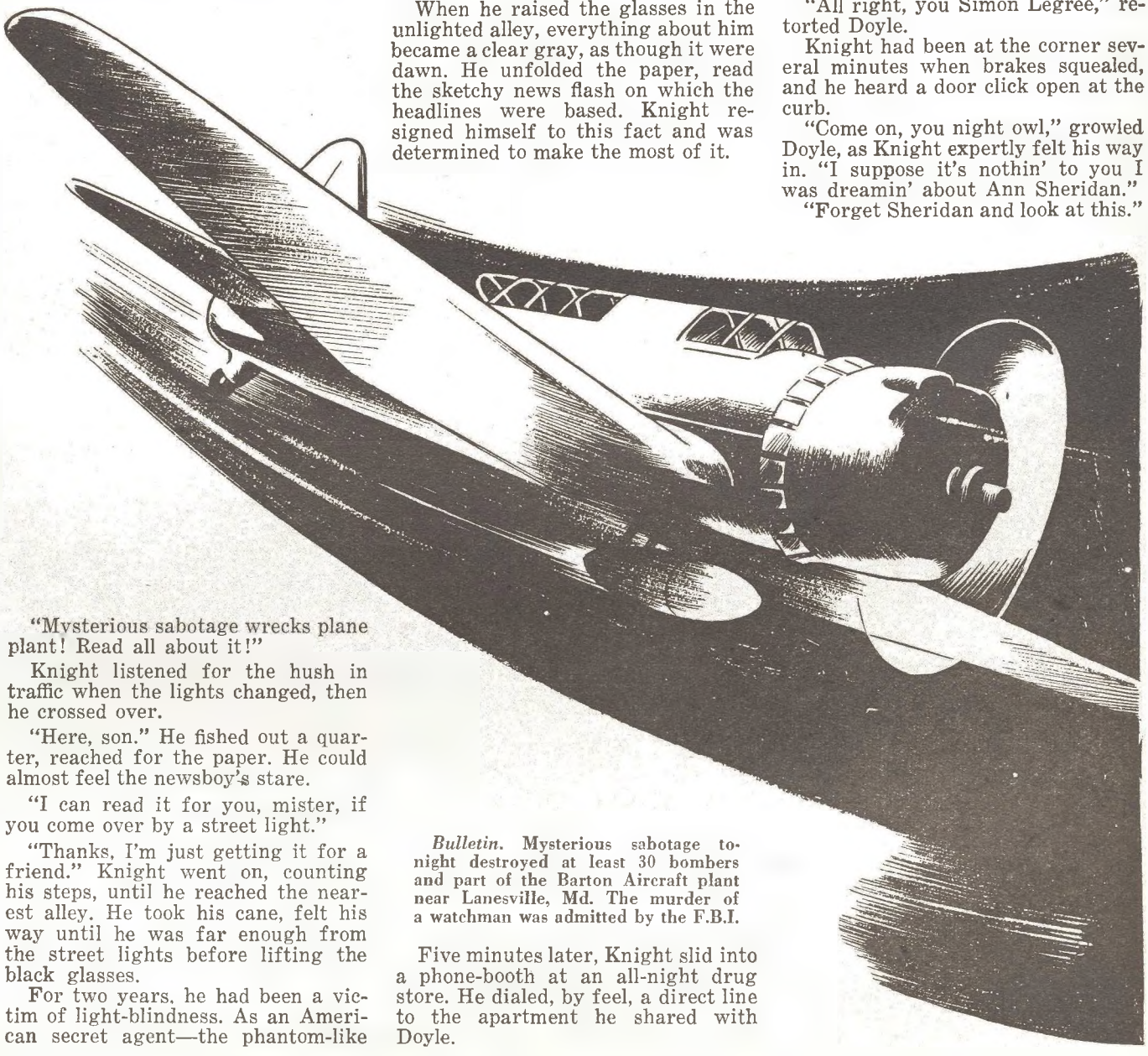
The Mad Ace

IT WAS nearly midnight when the man with the black glasses came out of the Shelburne Arms Apartments. He felt for the steps with his cane, descended with a calm assurance not often seen in the blind.

"Taxi, Mr. Knight?" asked the doorman.

"No, I think I'll walk." Knight tapped with his cane to locate the edge of the sidewalk. Then he started along the tree-shadowed expanse of New Hampshire Avenue, moving with a brisk confidence. Nightly prowls around Washington had made him familiar with its streets.

He was almost to Dupont Circle when he heard the shrill voice of a newsboy hawking an early edition.



"Mysterious sabotage wrecks plane plant! Read all about it!"

Knight listened for the hush in traffic when the lights changed, then he crossed over.

"Here, son." He fished out a quarter, reached for the paper. He could almost feel the newsboy's stare.

"I can read it for you, mister, if you come over by a street light."

"Thanks, I'm just getting it for a friend." Knight went on, counting his steps, until he reached the nearest alley. He took his cane, felt his way until he was far enough from the street lights before lifting the black glasses.

For two years, he had been a victim of light-blindness. As an American secret agent—the phantom-like "Q" long hunted by Axis spies—he had been almost trapped by the Gestapo one night in Paris. With the aid of "Lothario" Doyle, the hard-boiled ex-Marine pilot who was his right-hand man, he had escaped, but not before a Nazi bullet creased his forehead. Injury to the optic nerve had made his eyes supersensitive, forcing him to wear opaque black glasses to shield them from the sun and artificial light. There was one consolation. In darkness, he could see what other men could not.

When he raised the glasses in the unlighted alley, everything about him became a clear gray, as though it were dawn. He unfolded the paper, read the sketchy news flash on which the headlines were based. Knight resigned himself to this fact and was determined to make the most of it.

Bulletin. Mysterious sabotage tonight destroyed at least 30 bombers and part of the Barton Aircraft plant near Lanesville, Md. The murder of a watchman was admitted by the F.B.I.

Five minutes later, Knight slid into a phone-booth at an all-night drug store. He dialed, by feel, a direct line to the apartment he shared with Doyle.

"Whadda you want?" growled a sleepy voice.

"Grab your clothes, Lothario. Meet me with the car at northwest corner of New Hampshire and S."

"Now see here, Dick," Doyle said aggrievedly, "when do you expect me to sleep?"

"In the daytime, like me," answered Knight.

"Any dames mixed up in this?" Doyle asked hopefully.

"No dames. Keep your mind on your business."

"All right, you Simon Legree," retorted Doyle.

Knight had been at the corner several minutes when brakes squealed, and he heard a door click open at the curb.

"Come on, you night owl," growled Doyle, as Knight expertly felt his way in. "I suppose it's nothin' to you I was dreamin' about Ann Sheridan."

"Forget Sheridan and look at this."

Knight held out the paper. The dashlight clicked, and he heard Doyle whistle.

"Phew! Thirty ships! Whoever did that wasn't a piker. Wonder if the Japs got to the plant?"

"Doubtful," Knight replied. "You can spot those boys a mile away, and the F.B.I. has rounded up all of them. Head for Memorial Bridge. Navy's still got our ship out at the Hybla Valley field. We can be up at the Barton plant in less than an hour."

DOYLE started the car. Knight unpronged a radio microphone, called Naval Intelligence, and had an order phoned to Hybla Valley so that their Curtiss Scout would be ready. Changing the wave-selector, he got the F.B.I. monitor, made a brief report.

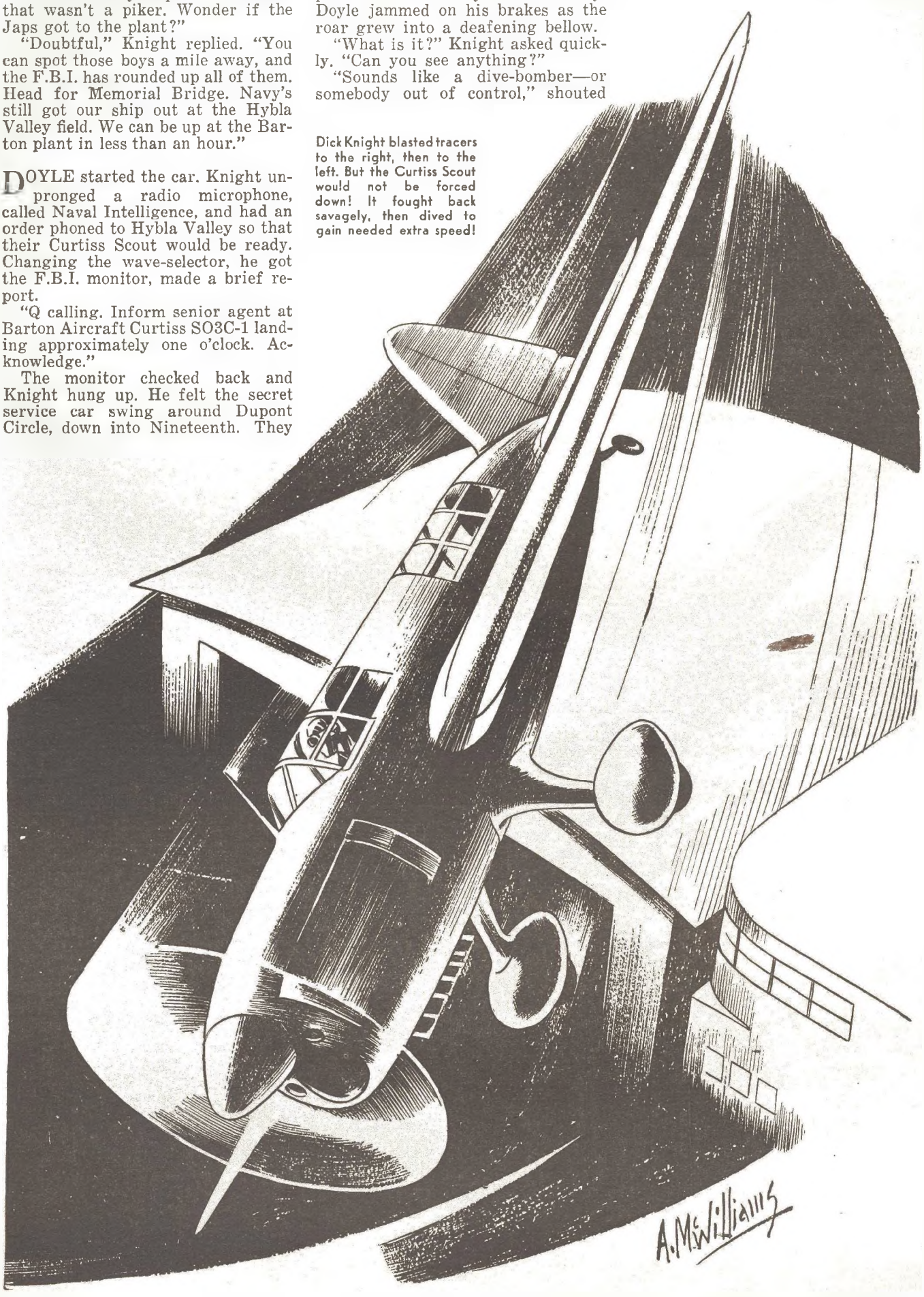
"Q calling. Inform senior agent at Barton Aircraft Curtiss SO3C-1 landing approximately one o'clock. Acknowledge."

The monitor checked back and Knight hung up. He felt the secret service car swing around Dupont Circle, down into Nineteenth. They had reached Constitution Avenue and were turning toward the Lincoln Memorial when the roar of a diving plane came suddenly from the sky. Doyle jammed on his brakes as the roar grew into a deafening bellow.

"What is it?" Knight asked quickly. "Can you see anything?"

"Sounds like a dive-bomber—or somebody out of control," shouted

Dick Knight blasted tracers to the right, then to the left. But the Curtiss Scout would not be forced down! It fought back savagely, then dived to gain needed extra speed!



Doyle. "Oh, oh! They just missed the Memorial!"

Knight heard the unseen ship scream out of the dive, zoom. Then abruptly its engine cut out. Doyle sent the car racing ahead, skidded around a turn.

"They're tryin' to make the old airport—no, they just headed back—" Doyle let out a yelp. "Holy smoke, they're goin' to flop in th' river!"

The car whirled around the Memorial and Knight felt it speed down toward the nearby Potomac. From somewhere to the left, not far off, there was a muffled crash. He reached for his glasses as Doyle stopped the car.

"Switch off your lights so I can see!"

"Okay—they're off!" yelled Doyle.

Knight removed his glasses. To his sensitive eyes the darkness instantly resolved itself into a gray light. Offshore, about two hundred feet away, was the almost submerged wreckage of a plane. It was impossible to tell the type, but it looked the size of an advanced trainer or light-bomber.

Two men were struggling in the water. Knight saw a bald head, a ghastly white face turned toward the shore. Then with a surge of horror he saw what the other man was doing. One arm seemed to be tangled inside his coat, but with his free hand he was savagely clutching for the bald man's throat!

"Get that Tommy gun!" Knight flung at Doyle. He tore off his hat and coat, ran to the edge of the sea-wall. But he was too late. The bald man had disappeared. The killer, swimming with one arm, was coming toward the shore. His swarthy, beak-nosed face had a look half-gloating, half-fearful as he reached shallow water and stood up, trying to see through the gloom.

"What's up? What do you want with th' gun?" Doyle burst out just as the swarthy man pulled himself onto the sea-wall.

Panic swept across the stranger's face. He lunged desperately at Doyle. Knight landed a swift hook to his jaw, and the swarthy man dropped. Doyle peered down, trying to see in what to him was heavy shadow.

"What's th' matter? Why'd you sock him?"

Knight did not answer for a moment. The thing he had just discovered had almost taken his breath.

"Lothario," he muttered, "you've heard of Baron von Igel, the Nazi ace?"

"Sure. He had sixty or seventy victories. Some Britisher killed him couple of months ago."

"This is von Igel," said Knight.

"What?" gasped Doyle. "Why, it can't be!"

"It's von Igel, all right. I met him casually in Berlin before the war. And that isn't all. Maybe you remember a German airplane designer named Otto Roetger? Was a bug on high-speed ships—ran afoul of the Nazis and disappeared."

"It's kind of hazy, but I remember th' name."

"He was supposed to be dead or in a concentration camp," said Knight. "He's dead now. Von Igel just murdered him."

"Judas Priest!" Doyle said hoarsely. You mean—out there, after they crashed?"

"Right. Von Igel choked him, and he went under. I was too late to save him."

THERE WAS a sudden hissing sound out in the water. A cloud of dense steam or smoke was rising from the wreckage as it went under. The water on the far side seemed to boil, or bubble from trapped air, then the hissing died out and the cloud quickly disappeared.

"What made that?" demanded Doyle.

"I don't know. The engine couldn't have been hot enough to—"

"*Nein . . . Lieber Gott,* don't make me go," the man on the ground moaned. He twisted his free arm as though frantically warding off some one, then subsided into an inarticulate muttering. Knight bent over, looked at what he had taken to be a khaki-colored flying-coat.

"Lothario—take a look at this. He's got on a strait-jacket."

"A strait-jacket! You mean he's nuts?"

"Looks like it. But why would they put an insane man in a plane?"

Von Igel moaned again. "Roetger! Let me turn back! I'm lost . . . too fast . . . never find Greenland."

His words were in German, but Doyle caught the last one.

"Greenland? What's that he said?"

"He seems to think Roetger forced him—" Knight stopped, shook his head. "No, that's impossible. If Roetger had invented some new ship that fast, we'd have heard a rumor of it."

"You don't think that ship flew here from Germany?"

"It's possible, but I don't believe it. Von Igel said something about being lost and not being able to find Greenland. But I've a hunch. Here, help me get him into the car."

The searchlight of a harbor police boat had stabbed across the water from a point downstream.

"Whatever this is, we don't want it to hit the papers until we've figured it out," Knight said crisply. "Grab his feet."

They dumped the dripping von Igel into the rear of the car. Knight climbed in beside him as Doyle took the wheel.

"Keep your lights off, Lothario. Drive down into Potomac Park and stop in some dark spot where I can search our dead-man-come-to-life."

Back in the direction of the Memorial, a police car siren wailed as Doyle started on. Knight looked back, but the roadway lights blinded him. After a few moments the siren faded out.

"Thank Heaven for that," exclaimed Doyle. "I thought they were on our tail."

"Somebody on the bridge must've seen the crash and phoned them where the ship hit," said Knight. "Pull in under a tree. We're clear now."

He turned around, saw that von Igel's eyes were open. There was a crafty look in them. He stared down at the floor of the car, apparently trying to see the Tommy gun Knight had placed there.

The Q-Agent took a .38 from his armpit holster.

"It's about time our friend came to," he told Doyle, without a hint to von Igel that he could see him in the dark. "I'll keep him covered. You'd better come back here and untie that strait-jacket."

DOYLE climbed out, opened the rear door. Von Igel closed his eyes as Doyle unfastened the already loosened straps. Under the strait-jacket, the Nazi ace wore a cheap black suit, now thoroughly soaked. Even his shirt was black; and dangling by a looped cord around his neck was a black hood.

Knight gazed at the black suit and hood, puzzled. Then he searched von Igel's pockets. They were all empty, but a sodden and torn piece of paper dropped to the floor as he pushed the strait-jacket off the seat. He took a quick glance. It was part of a map. Though the water had sloughed off some of the surface he saw that it covered the Atlantic coast and inland as far as the Alleghenies. A course-line had been drawn with pencil. Most of it was obliterated, but it extended into Maryland from some northerly point.

"Whatta you got there?" asked Doyle, his battered face wrinkled up from the effort to see in the gloom.

"The tip-off on von Igel. At least enough to know that Greenland stuff was phoney. Here, switch on the dome-light and look at this map. I'll keep my gun in his ribs, just in case."

He felt von Igel stiffen as the light went on.

"For the luvva Pete, he's a Blackshirt!" exclaimed Doyle. "I thought that was Mussolini's outfit."

"Notice the hood?"

"Well, I'll be! Say, maybe he's joined the Ku Klux Klan."

"They wear white," said Knight. "Take a look at the map and then switch off that light."

There was a pause, then a click. Knight opened his eyes, saw von Igel glaring at Doyle.

"I don't get it," said Doyle. "That

line could be part of a great-circle course from Germany to here. But where does that get us?"

"It's a course from somewhere to Lanesville, Maryland," rapped Knight. He saw von Igel jump. "Sit still, *mein Herr*. I've a couple of questions to ask you."

"I don't understand German," the Nazi ace said coldly in English.

"I suppose maybe your name's not von Igel, either?" grunted Doyle.

"Von Igel? I never heard of him," snapped their captive. "I'm an American citizen. My name is Albert Grew, and I demand—"

"You're hardly in a position to demand anything," said Knight. "Go ahead, Lothario, out to Hybla Valley. I think maybe a visit to Barton Aircraft will jog his memory."

Knight pulled down the window curtains, took a kick-seat facing backward so that no light from passing cars would blind him. Von Igel watched every move through narrowed eyes, his swarthy face tense. Once his hand edged forward for a swift grab at the Q-agent's gun.

"A .38 slug would make a mess of that hand," said Knight.

"*Teufel!*" the Nazi burst out. "You have eyes like a cat."

"So you don't speak German? Lothario, call Naval Intelligence. Tell them to phone Wing Commander Temple, the British air attache—even if they have to drag him out of bed. Have him phone me at Barton Aircraft in an hour. Tell them to say it's about Baron von Igel. Don't tell them we've got him, or they'll want us to turn him over. I want to take him along to ask about that sabotage job."

"It's going to be a tight fit in the SO3C-1," said Doyle.

"I'll fly him up. You can use one of the gunnery trainers. While you're talking with Navy, tell them to phone Hybla Valley and have the ships out and engines started."

Doyle put the call through. Von Igel relapsed into an ugly silence as they rolled across the Highway Bridge into Virginia. Doyle made rapid time to Alexandria and out on the Richmond road to the Naval Reserve training field at Hybla Valley. When the car turned off the highway Knight heard the two ships idling. Doyle stopped near the Curtiss SO3C-1 which the Navy had assigned them.

"I'm sorry, *Herr* Baron," Knight said ironically, "but you'll have to put on that strait-jacket again. I hope you don't mind."

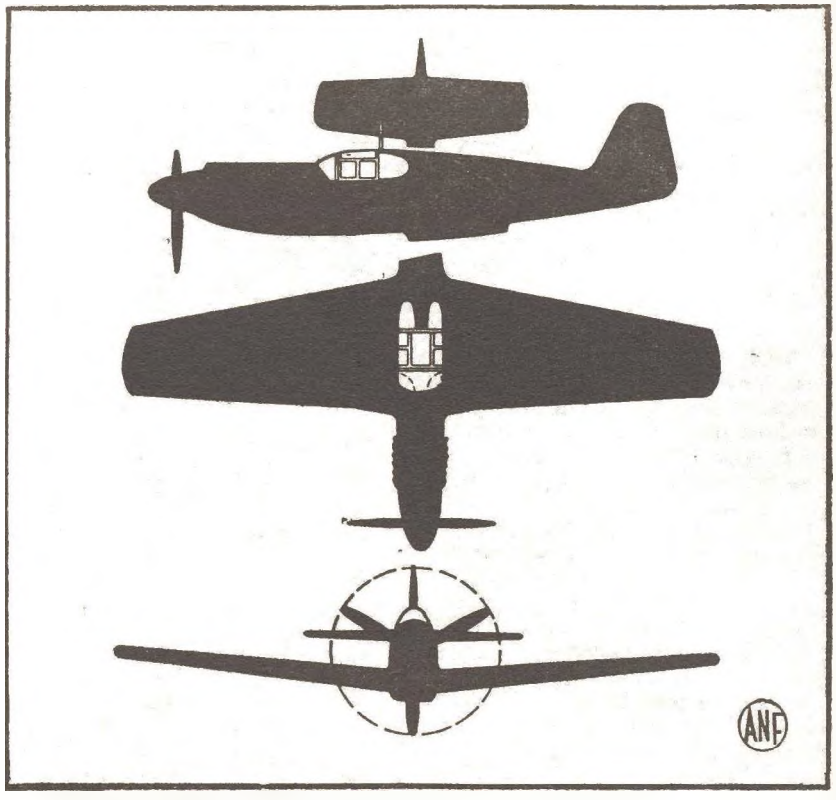
Von Igel sullenly reached down. Just at that moment a Navy man came up to the car. Before Knight could stop him he turned on a flashlight, pointed it inside. Knight's eyes flicked shut against the glare.

"Look out!" shouted Doyle.

Knight jerked back, but too late. The .38 was violently wrenched from his grasp. He struck blindly at von Igel, missed. As he sprawled headlong he felt the Nazi ace leap over him. The Navy man gave a stifled cry, then abruptly the blinding light was gone and Knight could see again.

Know America's Planes

NUMBER THIRTEEN



FAST, hard-hitting fighters rank high among the aerial weapons America's aircraft industry is turning out for our aerial defense. This is one of the newest, swiftest, most potent—the North American P-51 Mustang, which is being supplied to both the U.S. Army Air Forces and Great Britain.

The machine is arranged as a low-wing monoplane and is very similar in appearance to both the P-40 and the Spitfire. The fuselage is built-up in the conventional manner, incorporating transverse frames and longitudinal stringers over which metal skin is attached. The cockpit is directly over the wing center section and appears to afford a very limited view downward. Like the fuselage, the wing is of metal structure and is covered with metal sheet. It is faired to the fuselage with a generous fillet. The landing gear legs retract up and in.

Power is supplied by a liquid-cooled in-line Allison engine of 960 h.p. at 1,200 feet, giving a maximum speed of more than 400 m.p.h.

Other data: Span, 37 feet; length, 32 feet 3 inches; height, 8 feet 8 inches; wing area, 209 square feet; range, 640 miles; loaded weight, 7,708 pounds; ceiling, more than 36,000 feet. It has been stressed for higher power.

CHAPTER II

THE HOODED MEN

VON IGEL was racing toward the SO3C-1. The Navy man, a mechanic, lay on the ground with a welt above one eye. Knight scrambled out, ran toward the Scout with Doyle at his heels. The Nazi leaped onto the wing, whirled and pumped two shots at his pursuers.

Both shots went wild, but before Knight could reach the ship von Igel had vaulted inside. The engine revved up, and the Curtiss lunged ahead as he let off the brakes. Doyle fired three shots after him, sprinted to the Vought SB2U-1 being used for gunnery. Knight was already climbing into the front cockpit. Two mechanics and a petty officer dashed up belatedly with .45's.

"Halt!" bawled the petty officer.

"That's Dick Knight, you idiot!" shouted Doyle.

Knight leaned out as Doyle swung in behind him.

"Phone Naval Intelligence!" he told the petty officer. "Have them flash a lookout for that ship and an order to arrest the pilot."

The Scout was thundering across the field. Knight sent the Vought

(Continued on page 64)

How to Collect Air Books

If you intend to start a library of aviation books, follow this authority's advice and your collection will profit.

by Edgar Deigan

THE TROUBLE with the average or would-be collector of aviation books is usually a lack of definite aim or purpose. He rarely has little more than a blind eagerness to acquire all the material he can on his favorite hobby. But all he needs to make his collection stand out from the ordinary "garden variety" is a few pointers and a start on the right road.

So many fellows, after years of patient toil, have nothing more than either an old shoe-box crammed with clippings or a dog-eared scrapbook loaded with pasted-in photos, articles, and numerous odds and ends. Now think it over. Just what do these "collections" amount to? Frankly, they are of absolutely no particular value, excepting the pleasure they give the hobbyist to thumb through and reread the exploits of his favorite aces or stories of their deeds aloft.

Chances are that he will have a mass of material, much of it duplicated over and over again. So many of the clippings are merely a rehash of hackneyed accounts that have been appearing over the years since the World War ended.

To begin with, this average collector should ask himself these questions: Will my collection be permanent, compact, clean? Will I have ease of reference, be able to find what I want quickly? Will it have a definite value, be of interest to others as it is to me?

If you have difficulty in answering all these points satisfactorily, why not have your own private library of a shelf or two of carefully selected books?

"But," you object, "I don't know how to secure the books that will enable me to have my own library." Yes, that is quite true of the inexperienced collector. But if you wish to really further your hobby, write to the New York Public Library, 42nd St. and Fifth Avenue, New York City, and tell them that you wish to purchase a copy of William B. Gamble's *History of Aeronautics, A Selected List of References to Material in the N.Y. Public Library*. This paper-covered volume is a genuine gold mine of information regarding all the aeronautical books you could ever hope to own. Each division of aviation is completely dealt with, including a list of books of bibliography. And if you visit that library, you can have a list of the books you want to inspect made up before your visit. Many of the books will be found in Room 118, particularly the technical and historical items.

Another important aid to the collector is Paul Brockett's *Bibliography of Aeronautics*. This series of paper-covered books is even more detailed than the Gamble volume, and goes back to the year 1909. For the Brockett Bibliography, write to the Superintendent of Documents, Government Printing Office, Washington, D.C. Ask for the prices on the available years. By the way, they are extremely inexpensive.

Granted that you will try to obtain these two important bibliographies, I would suggest that you specialize—in other words, don't try and cover the entire field of aeronautics; pick out the period that holds your interest. Roughly speaking, divide the field into the following: Pre-war, World War, and modern. It would be impractical to attempt to obtain every volume ever printed, even if you were so ambitious. Just to discourage useless hope in that direction, in Gamble's Bibliography alone there are 5,574 items described!

Mr. Deigan proudly displays one of his most prized books—an early copy of "Jane's." The author has more than 600 volumes in his aviation collection.

MANY YEARS AGO I decided to concentrate on the World War period, because it has always held a deep fascination for me. In the four years of the war, aviation grew from a mere experiment to a full-sized industry capable of both tremendously enriching or completely destroying any nation on earth. During these years, too, were born the glorious legends of the modern knights who flew to glory and performed prodigious deeds in the skies. The old books of this time are filled with many thrilling stories about the famous aces and their aerial steeds.

Varied indeed are the books devoted to 1914-1918, particularly the books published after the war when the censorship was lifted. The bitterness had somewhat worn away and both sides allowed the true picture to be cleared up. Though former enemies, this was all altered. The wartime heroes could write of their aerial battles objectively. With the heat of battle gone, they could coolly appraise their "opposite numbers" and realize once again that no one nation had a monopoly on courage. Writing their stories after the war, these men had no reason to either mask or touch up the events that actually occurred. The entire picture could be brought into focus, whereas in their fighting days they were too close to the panorama of war to see much farther than the next flight or mission. There is a considerable number of these books still available to the collector. It should be noted, too, that the majority of these

biographical volumes are usually comparatively inexpensive.

It should be remembered that many of the World War aviation books are out of print today. This means that they are, generally speaking, more expensive today than when originally published. Then, too, there is a good demand from collectors everywhere for these O-P volumes. To break down costs for the novice, it may be explained that biographical books are usually less expensive than historical or factual books. In turn, the technical items are usually the most expensive, as well as being the hardest to get.

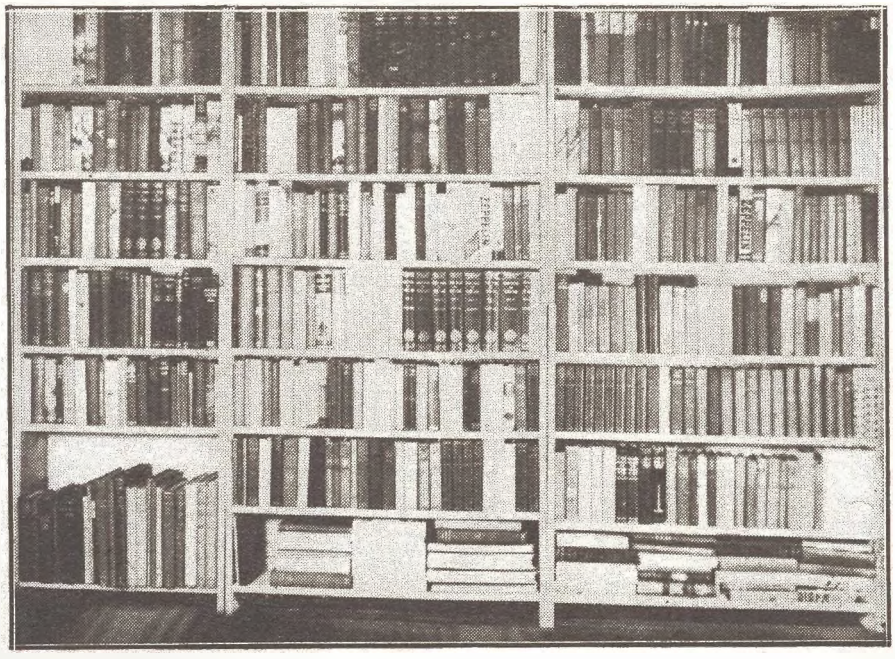
The historical and factual books are held in high esteem by the student of wartime aviation. He demands the truth, nothing but the truth. He wants only authenticated facts and figures. He wants to know just how many Allied planes were shot down on a given date, the exact location of the pursuit squadrons in France, the precise time at which von Richthofen was shot down that April morning in 1918. Very well then, if you must have the exact truth you must be prepared to really spend money. For an illustration of cost, take the official British history, *War in the Air,* by Raleigh and Jones, six volumes plus appendices. The list price, new condition, comes to about $65.00. This is out of the financial reach of most readers, but it is a wonderful source of facts and invaluable to the student of aerial warfare.

It is unfair, I suppose, to pick out a book or a set of books and hold them to be the answer to the collector's prayer. The Raleigh and Jones history was selected purely because it is recognized as an extremely meritorious work. It is again unfair to suggest that the *Jane All the World's Aircraft Yearbooks* for the war years and up to 1920 be added to your library. These annuals are among the most difficult volumes to obtain. It certainly is true that the best photographs and details of constructional features of the warplanes are to be found in the Jane annuals, but their cost and rarity are the two reasons why the ordinary collector can forget about them.

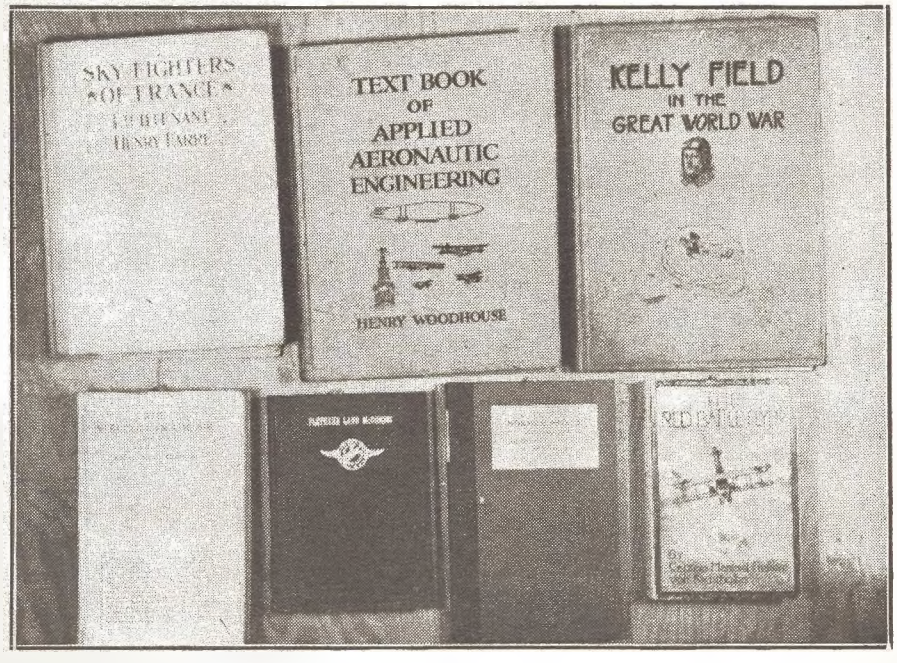
While on this business about the Jane books, I'd like to advise those who live in the larger cities to see if their public libraries have bound volumes of either *Flight Magazine* or its American counterpart, *Aerial Age,* for the years 1917 through 1920. I believe the *Flight* issues published during this time contained an even greater amount of constructional details of the captured enemy planes than appears in the Jane yearbooks. These reports were furnished at the time by the Air Ministry and were the result of inspections and tests made of captured planes.

To embrace all branches of aviation and describe the volumes that stand out in each field would not be possible within the limits of this article. Instead, I'd rather try to give the newcomers to the collectors' ranks a few tips that were learned the hard way. Assuming that you have the Gamble and Brockett bibliographies to help guide you, purchase a box file and a set of alphabetical index cards of the same size. I would suggest a file approximately 5 by 7 inches, or one that will hold a number of postcards easily.

This file will be very useful, helping keep a record of the books you inspect at your library or those that friends loan you. You can also keep a record of just what page or chapter holds something of interest. You can also file away book reviews from FLYING ACES so that when you are ready to buy you can have a fair idea of what you need, how much it will cost, and from what publishing house it may be obtained.



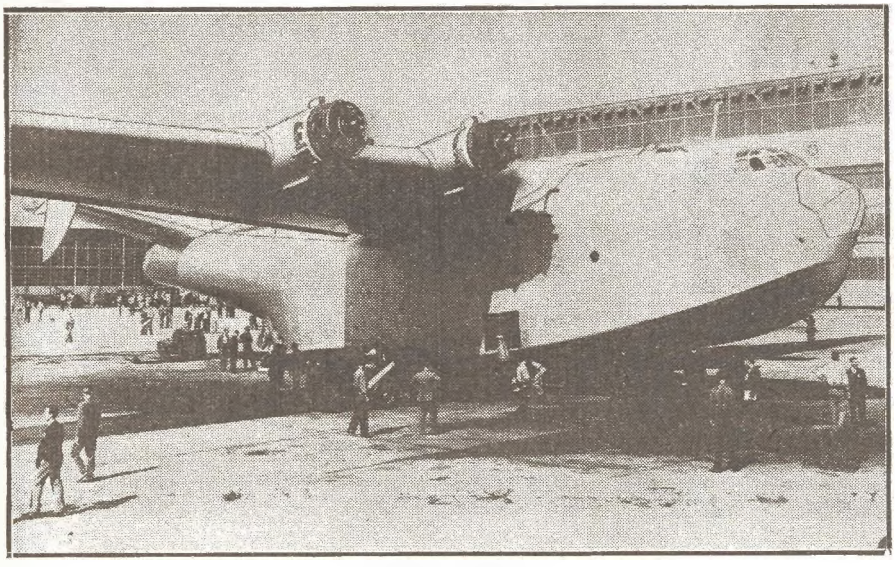
This shows only a small section of Edgar Deigan's library of World War aviation. Below: Few collectors can boast of owning all of these scarce books. Their total value is much more than most enthusiasts would care to spend.



AS FOR BUYING the books you want, I would suggest that you put away a certain amount of your spare money. The main purpose of this ready cash is to enable you to have the money at hand when you see a book you really want. This is important. Many books are hard to get and do not show up very often in the dealers' stocks. If you decide to wait "a couple of days" you might lose something you have been trying to buy for months or even years. The chances are that the dealer will send out several postcards quoting the same book to you as well as several other collectors. It is necessarily a matter to the dealer of first come, first served. You will observe that a dealer usually has a protective line on his card reading: "All books sold sub-

(Continued on page 78)

Modern Planes Album



MARTIN XPB2M-1

MARTIN XPB2M-1

LIFE aboard the Navy's Gargantuan flying battleship, the XPB2M-1, will be much like that aboard a surface warship, it was recently disclosed by the Martin Company.

Counting out the vital bomb bays, fuel storage space, auxiliary engine rooms, and equipment storage and action decks, this air giant has remarkably spacious and comfortable quarters for its crew. There are sleeping accommodations for thirteen men; the normal crew is eleven. And what's more, the staterooms are amply large. Also, in addition to galley and other necessary and usual facilities, there are two showerbaths aboard the XPB2M-1!

What the bomb load of the job will be is a strict Navy secret, but it is admitted that the machine will have an extremely high percentage of useful load. Facts about defensive firepower are concealed with equal care, but it is admitted that the plane will have "extraordinary heavy" defense.

While this flying boat is a tactical weapon, it is estimated that, were it to be used as a troop transport, it could carry 150 fully equipped men without too great crowding.

An interesting point is that this patrol-bomber is the first airplane to carry a motorboat in its life-saving equipment. This tender is a collapsible craft with an outboard motor.

The plane is powered by four Wright Duplex Cyclone engines with a total rating of 8,000 horse power (more than twice the power of a giant two-car diesel-electric railroad locomotive). Its weight is given at 140,000 pounds. The wing span is 200 feet, the hull length is 117 feet, and the vertical fin stands 36 feet high.

AVRO MANCHESTER

ONE OF BRITAIN'S latest heavy bombers is the giant Avro Manchester which is nightly blasting to bits strategic Nazi-occupied ports and factories in France and other dominated countries. This is one of the "big three"—their other new heavy bombers being the Stirling and Halifax.

The Manchester is one of the largest landplane bombers in the world. That much has been said by the Royal Air Force, even though exact specifications and details have not been made public. It is of all-metal construction, utilizing the usual transverse frames and longitudinal stringers, covered with riveted-on metal sheet.

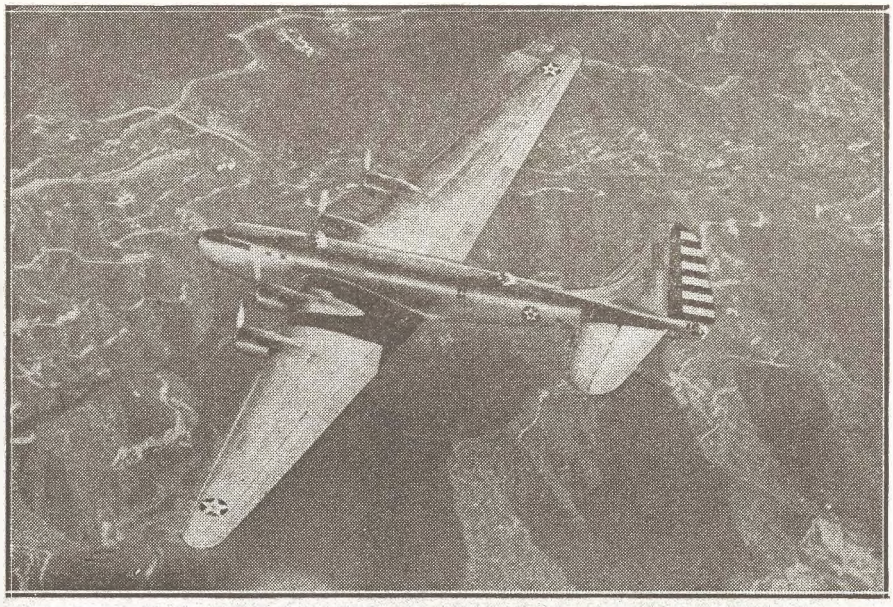
AVRO MANCHESTER

As far as can be determined, there are four gun positions: in the nose, amidships, in the tail, and in the belly. All of these stations are equipped with power-operated turrets mounting from two to four machine guns. A crew of seven is normally accommodated—pilots, co-pilots, bombardier, and gunners. The bombardier and one of the gunners also act as navigator and radio operator.

The wing, like the fuselage, is built-up entirely of metal and is of the cantilever variety. Flaps are operated either manually or mechanically, and ailerons are covered with fabric. The landing gear legs retract directly into the engine nacelles, being streamlined in place by folding doors. Information concerning the engines has not been released, but it is believed that they are of Napier manufacture. Also, it is clear that the power plants must be exceptionally powerful, because only two are mounted. It seems that somewhat of a risk is taken here, employing only two engines for a *very* heavy bomber, whereas all similar types mount four.

In the usual British fashion, the twin tail is forward of the extreme end of the fuselage. This, of course, makes for a greater arc of fire for the rear gunner and his eight weapons. Excellent visibility is provided for the pilot, through the generous use of transparent panels, and the bombardier is stationed in the extreme front of the plane.

All in all, we'd say that, even though this might be a new and modern ship, it certainly does not have new and modern lines.



DOUGLAS B-19

DOUGLAS B-19

WE HAVE not previously presented the B-19 simply because there had been so much said about it elsewhere that we thought it would be better to devote that space to reviewing other late models. Now, however, that novelty has worn off to some extent.

This is the largest and greatest heavy bomber ever built in the history of aviation. It has a wing span of more than twice that of the huge Boeing Flying Fortress, and its vertical fin stands higher than the average three-story building.

With all this, the B-19, which was in the process of construction for something like three years, is an entirely conventional plane. Further, because of its enormous size and the difficulties which were encountered in fabrication, it might well be considered one of the greatest engineering feats of this century. The fuselage was built in three separate sections, and when the workmen joined the units they were said to have fitted perfectly. That's craftsmanship at its best!

The ship, however, should not be considered as anything more than a mere experiment, for it is inconceivable that such a machine would have a place in airwar under the present system. It would not only offer too good a target but is also so large that ordinary war-time flying fields would probably be entirely too small to accommodate it. In addition, fabrication of such a craft is entirely too costly to warrant its wartime use and possible destruction. Such a loss would well be comparable to the sinking of a luxury liner or an important battle cruiser. The plane was said to have cost $3,500,000!

Power is supplied by four air-cooled radial Wright Duplex Cyclone engines of 2,000 h.p. each at take-off, giving an estimated top speed of 210 m.p.h. Cruising speed is believed to be 186 m.p.h., and landing speed is near 69 m.p.h.

Other data: Span, 212 feet; length, 132 feet; range, 7,750 miles; loaded weight, 164,000 pounds; ceiling, 22,000 feet.

GRUMMAN J4F-1

GRUMMAN J4F-1

ORIGINALLY DESIGNED as a commercial amphibian for private use, the J4F-1 has been purchased by the Navy for general utility work and by the Royal Air Force as an ambulance ship to pick up airmen shot down over the English Channel and to rescue crews of sinking surface vessels. For military duties, the usual seats and interior accommodations are replaced by other equipment.

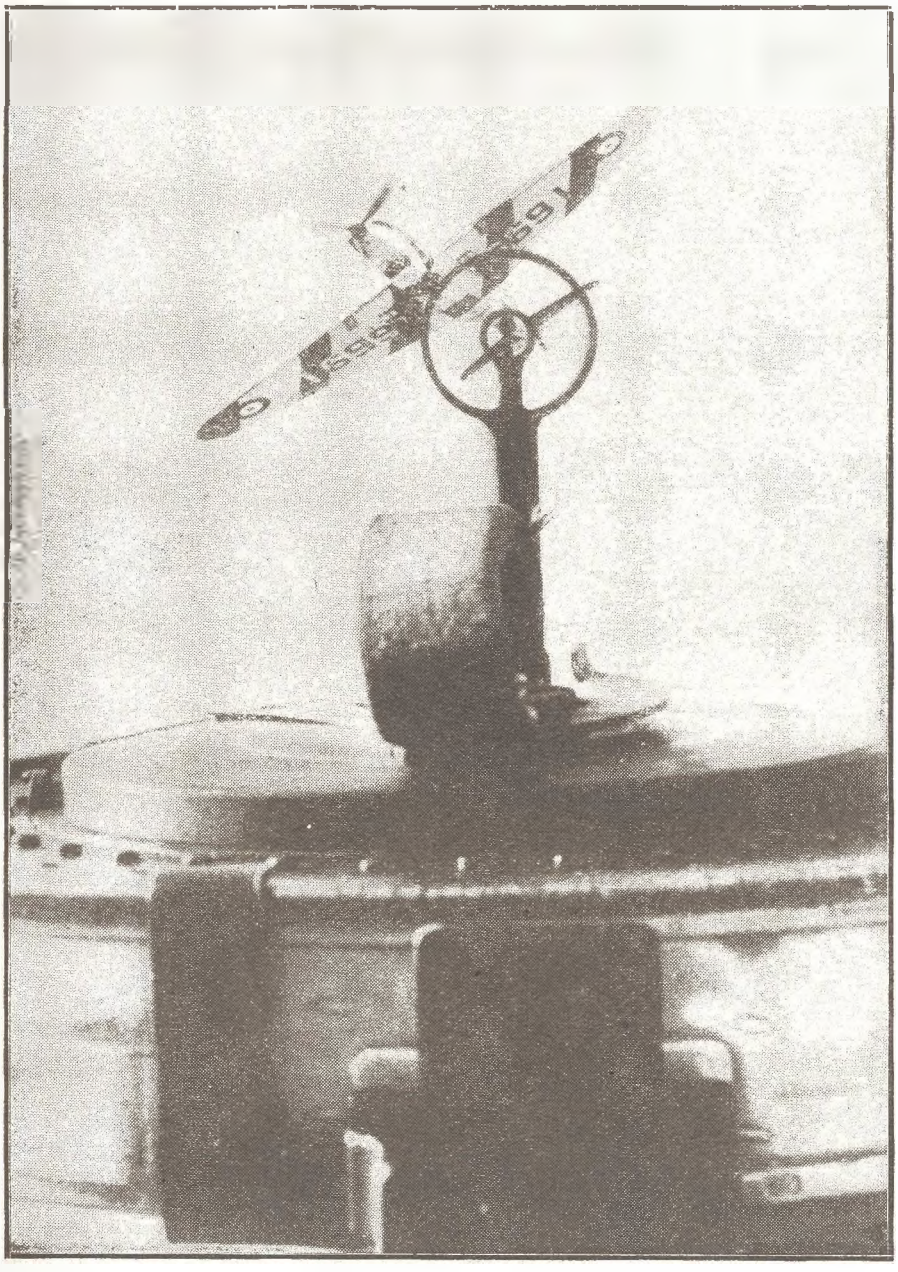
The J4F-1 is a high-wing cantilever monoplane of all-metal construction. The lines blending the wing root into the hull behind the deep rounded windshield continue back to a cantilever tail that grows smoothly from the hull streamlines. The deep, rugged, all-metal hull is divided into six watertight compartments.

The wing is of all-metal structure and uses the box beam construction principle. The center section is integral with the hull to a point just outboard of the engine nacelles. The outboard panels are fabric covered aft of the box beam to further facilitate inspection. Wing floats are mounted on parallel "I"-struts braced with wire. The horizontal elevator and fin is braced externally by one strut; covering, in the usual fashion, is fabric over metal structure. The vertical fin is also faced with fabric.

Wheels for land set-downs are retracted in the usual Grumman style, being flat against the hull when in the "up" position. The tail wheel folds into a well behind the second step in the hull bottom.

This plane is really nothing more than a small version of the G-21A. It has substantially the same exterior lines and is constructed in identical fashion. The main difference is the use of inverted Ranger engines instead of Pratt & Whitney radials. The twin in-line power plants are rated at 200 h.p. each at sea level, giving a cruising speed of 150 m.p.h. at 3,000 feet; the landing speed is 61 m.p.h. Maximum speed has not been released.

Other data: Span, 40 feet; length, 31 feet; height, 9 feet; empty weight, 3,075 pounds; loaded weight, 4,500 pounds; wing area, 245 square feet; rate of climb, 870 feet per minute; service ceiling, 15,000 feet.



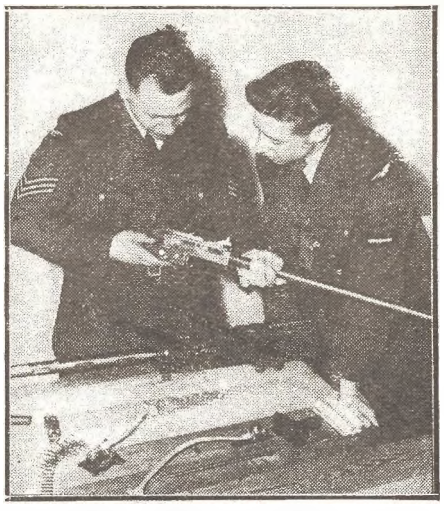
18-MINUTE MEN OF THE AIR

Air gunners for six long months are trained for a hazardous war job in which the average combat life expectancy is only eighteen minutes.

by

Flying Officer John L. Scherer, RCAF

Illustrated with official Royal Canadian Air Force photographs



An instructor explains the operating mechanism of a machine gun to a student. Gunners must be able to assemble m.g.'s blindfolded.

This is the dramatic sight confronting a student gunner when peering through the sights of his deadly Lewis gun as he "draws a bead."

THE MAN behind the gun has never received the acclaim that falls to the pilot in military aviation. However, it is the pilot—the man who knows—who is first to credit the gunner for doing a job of No. 1 importance. He knows that the air gunner is the fellow who makes it possible for the bomber to reach its objective and return home again. The best pilot, navigator, and bombardier's efforts would be for naught if the gunner was not on the job to fight off enemy planes that are almost certain to harry the bomber on its mission over enemy territory.

The air gunner *has* to be good—if he wants to survive. He has to get the other fellow first. That means shooting more quickly and accurately than whatever number of enemy aircraft may attack from any direction at any second of the four to twelve hours of a bombing or scouting mission.

One can readily understand that an air gunner must be given the best possible training prior to actual combat if he is to carry out his so important job in a manner calculated to provide maximum protection to the crew of the plane in which he flies, to say nothing of his own safety. This fact is keenly appreciated by the authorities responsible for planning and executing the training of air gunners for the Royal Canadian Air Force.

Before taking you on an imaginary visit to a Bombing & Gunnery School where, as an officer in the RCAF, I helped to train air gunners, I want to point out that the air gunner is also a wireless operator. He differs from a pilot or observer in that he is not enlisted just as "aircrew" but as a Wireless Operator-Air Gunner. His training is directed to this dual job right from the beginning. From the Manning Depot he is sent to one of four Wireless Schools where he completes a 20-week course

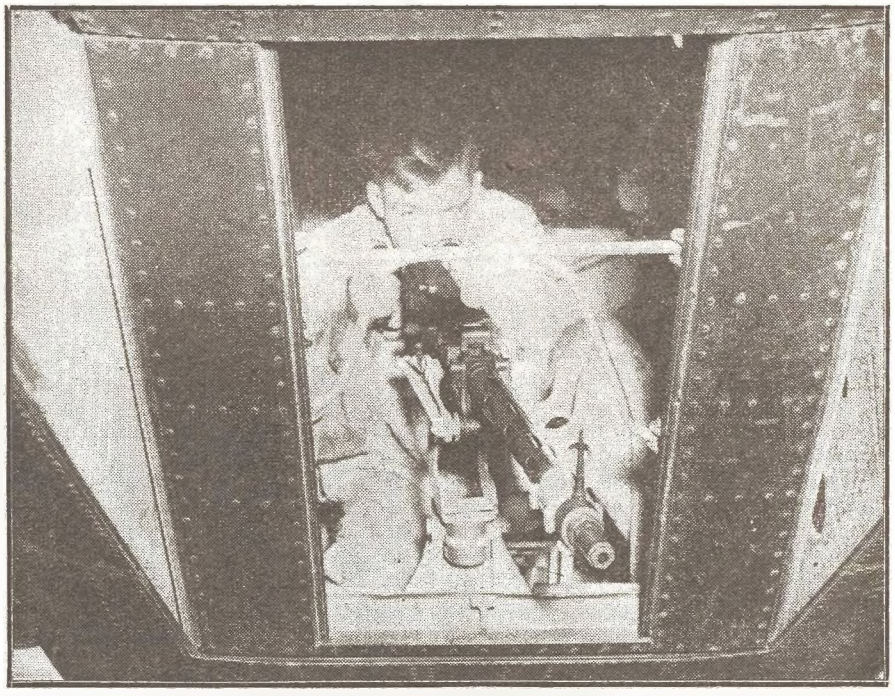
consisting of classroom work on Morse code, mathematics, sanitation, hygiene, anti-gas defense, and Air Force Law. Emphasis, of course, is placed on the Morse signalling—by buzzer, semaphore, and lamp.

For about 17 weeks, the student "Wag," as the Wireless Operator-Air Gunner is known in the service, spends his time on the ground mastering the radio theory and practice which will train him for handling two-way communication between plane and land. After he has shown that he knows his ground school lessons well, the "Wag" takes to the air.

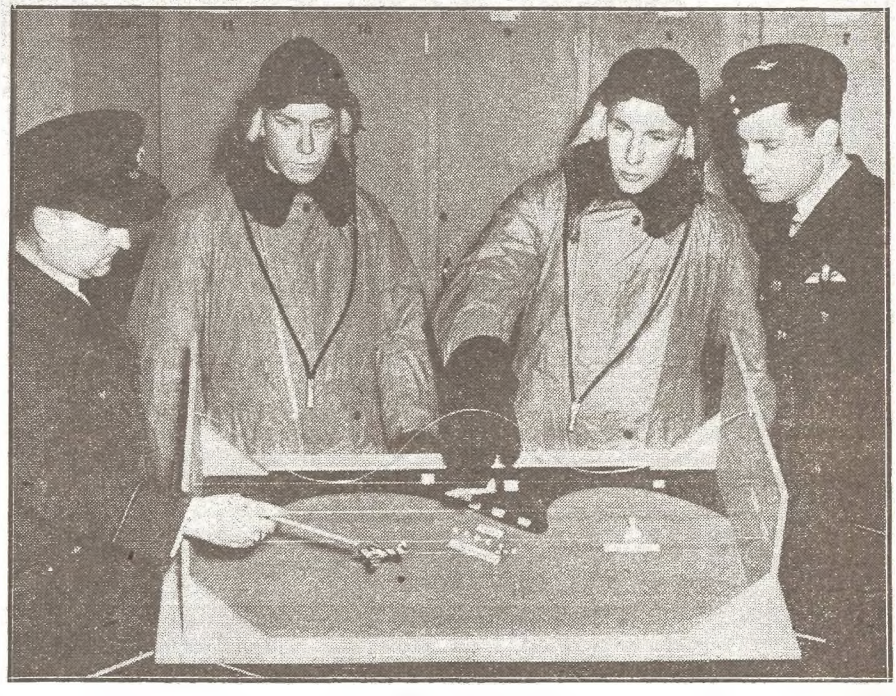
His flying includes four hours in a large Norseman single-engine (550 h.p.) monoplane in which he goes aloft with four other students, an instructor, and a pilot. Cross-country flights are made during which he maintains two-way communication between the plane and his ground station.

Upon completing the 20-week course at the wireless school, the "Wag" is given his "sparks"—an arm badge that shows a hand clenched around two lightning bolts. This signifies that he is a qualified wireless operator—the fellow who gets bearings by which the observer calculates his position, and the chap who keeps his aircraft in touch with the ground staff while on a mission.

Our "Wag" is now ready to undertake the second half of his training and moves on to a Bombing & Gunnery School for four weeks of intensive gunnery training. Come with me on an imaginary visit to the No. 1 Bombing & Gunnery School at Jarvis, Ontario, on the north shore of Lake Erie, and I'll tell you how the "Wag" wins his coveted half-wing with the letters "AG" encircled by a Victory Wreath.



Protection for the belly of a Fairey Battle. Be careful, Mr. Nazi, because this chap has an eagle-eye! Below: Flying Officer Scherer (left) instructing students by means of model planes placed in simulated combat positions.



LIKE ALL B & G Schools, Jarvis station is a town in itself. As you drive up the road approaching it you notice the long row of hangars, the score of smaller buildings which house the airmen, student gunners, and officers, as well as the buildings which serve as classrooms, ground bombing range, and machine gun shelters. I am not permitted to state how many men are in training at the station, but you can take my word that there are plenty. These stout-hearted student gunners are undaunted by the knowledge that their future job is conceded to be one of the most dangerous of military work. Strangely enough, there is no difficulty in getting applicants for berths as air gunners. Of such stuff are these Canadian lads made!

Below: Bedecked with an ammunition belt, this AG gets a parting word of advice from his instructor before going on a practice flight.

Assume that I met you at the gate where you have had to wait until a pass was issued. And now, we'll visit the flying line and see what manner of plane it is in which the student gunners go aloft.

See that line of long, bullet-shaped machines? They are Fairey Battles. They were not built to train gunners, but when they were retired from active service overseas because they had become obsolete—too slow—they were pressed into training service; and they are doing the job in A 1 style.

The Battle looks like a large edition of the Hurricane. It is powered by a Rolls-Royce Merlin engine of 1,030 horse power and has a maximum speed of 210 m.p.h. at sea level, a cruising speed of 200, and a landing speed of approximately 75 m.p.h. It weighs about six and one-half tons.

While they are warming up a Battle so that I can fly you "over the line" out on Lake Erie where the gunnery and bombing ranges are located, I want to tell you a bit more about the "Wag's" training.

Before the student gunner is sent aloft to indulge in actual air firing, he must attend classroom lectures on the construction and operation of weapons. And by the time he has successfully completed his ground school training at the gunnery school, he will be able to take down and reassemble his machine guns blindfolded! That will come in handy some night when he is clearing a jam in a darkened aircraft in a still darker sky over enemy territory.

When a gunner spots an enemy plane he is concerned with three basic problems: One, Recognition (friend or enemy?); two, Range Estimation—when is the enemy plane within range? Bullets must not be wasted; three, Relative Speed. The enemy plane may be flying forward, toward the war, up or down, or in a combined direction. The machine gun must be aimed accordingly.

During the ground training, the student spends many hours studying scale models of both enemy and friendly aircraft. He learns to recognize these instantly, regardless of position or angle of approach. A second saved in identifying an approaching aircraft may mean the difference between life and death in actual combat.

Estimation of range is practised with model planes. Scale replicas are made to slide along a wire, and by correlating the distances from the gun sights with corresponding ranges for life-sized aircraft, a very accurate reproduction of aerial combat conditions is achieved. The student peers through his sights, notes the apparent size of the model, and then calls out his estimate of the various simulated distances.

THE BATTLE is warmed up now, so let's get aboard and go "over the line" to see how an air gunner gets practical firing experience. I'll take the pilot's cockpit up front and you'll have to clamber into the rear pit with a student gunner. You'll have plenty of opportunity to see him work once we get aloft, although you'll have to ride backward to observe him in action.

Climbing to 3,000 feet, we soon leave the station behind as the Battle purrs along at 200 m.p.h. "Purr" is the word, for the smooth rumble of the Rolls-Royce engine, with its triple-bladed propeller, is just that and not like the harsh roar of the average training plane.

We are now out over Lake Erie, about two miles offshore. Here we circle while waiting for the "drogue" or target plane. And while we're waiting, I'll take time to tell you, over the inter-cockpit phone, that prior to actual air-to-air firing practice, our "Wag" has put in several hours at camera gun exercises aloft. In these exercises, two aircraft with gunner crews participate, each alternating as the target plane. The gunner aims his camera gun at the plane weaving around behind the tail of his machine. Each time he presses the trigger of his camera gun a photograph is taken. The developed pictures show whether or not he scored any hits. These exercises have prepared our "Wag" for aerial work with "live" ammunition.

There's the drogue aircraft approaching us now. I'll continue circling until he gets nearer, and then I'll zoom to secure a position abreast of him with our gunner aiming outwards toward the lake.

We have the target plane in position now. He's streaming the drogue—a long linen sleeve—which will be the target for our gunner. It is attached to the target plane by a 1,000-foot cable. There goes the signal to "open fire"—a lamp flashed by the crew of the target plane. We're all set, so I'll give the gunner the command: "Open fire."

Br-r-r-r-rt! That's the machine gun's chant. It fires at a rate of about 1,100 rounds per minute, but the gunner opens fire in short bursts only. He is trying to "group" his shots rather than have them hit the target in "Indian file"—strung out, that is. It's concentrated fire that does the trick in aerial warfare, not the stringy type.

We're nearing the end of the line now, so I command the gunner to "Cease fire." We don't want him to be shooting as the target plane turns for another run. There is a time during the turn when the target is in line with the towing plane, and our gunner's shots would be likely to creep into the pilot's cockpit.

The target plane has straightened out for the return run, so I'll tell the gunner to "Open fire." Usually, we have two gunners aboard, necessitating the use of red-painted bullets by one so that we can determine which gunner scored. The red-tipped bullets leave their mark on the sleeve as they pass through it. However, since we have only one gunner on this trip he is using plain-tipped bullets.

This exercise we are doing is the most simple of all, inasmuch as we merely maintain a steady position abreast of the target while the gunner pumps away. However, before he completes his course he will have participated in a sequence of maneuvers designed to teach him to shoot calmly, quickly and accurately. During these later exercises the drogue will be in many positions relative to his gun—ahead, behind, up, below, or rising and falling.

The gunner has advised me that, for better or worse (and you'd be surprised at how good they really get) he has completed the exercise. I let the drogue pilot know this by banking from side to side. Then he

"Over the line" in a Battle, waiting for the target plane. The Battle is powered by a Rolls-Royce Merlin engine of 1,030 h.p. and has a maximum speed of 210 at sea level.

acknowledges my signal by dipping his own wings. He has peeled off now and is descending toward that big field along the shore where he'll release the drogue. It will be picked up by a ground crew who will examine the linen sleeve and note the hits scored by our gunner. The target plane will then climb back "on the line" and stream another linen sleeve for the next gunnery student.

YOU probably noticed that I lost altitude as I streamed beyond "the line." I'm heading for the water targets and will use only 500 feet of altitude for the exercise to be done there. We are close to shore and low now, so you'll get the sensation of speed as we whiz along at 210 m.p.h. while the gunner again prepares his gun for action.

We're now over the water target range. See those squares in the water off to the left? There are five of them, and it's the gunner's job to try and hit them as we scoot by. Again, he is shooting out toward the lake and away from shore. You can figure why when you notice those Summer cottages just off our right wing.

That was just a practice run over the targets. The next time we go by I'll tell the gunner to "Let 'em have it."

Here we are, so—"Open fire." There's the familiar "Br-r-r-r-rt." Notice that he is firing in short bursts at each square as we go by, trying to group the shots on each.

That makes five runs over the water target, and I imagine the gunner has now used up his ammunition. Yes, he's ceased firing and there's his voice on the inter-cockpit phone telling me "Exercise completed, sir." We'll go back to the station now.

There's the station below. Notice another Battle getting ready to take-off as I glide in for a landing? Every flight is on schedule here, as at all gunnery schools. One plane is ready to take-off as the other comes home. There is no delay, for woe is the lot of the pilot who scrambles up the schedule and causes a plane to wait on the runway while another is landing or taking off. If we finish an exercise too early, we must hover over the airdrome until the exact time for landing.

We are down now and I'll have to apologize for the bump. I usually bump a couple, and it was your lot to be a passenger this time. Did you notice that Battle with the broad red stripe around the fuselage? That's a plane assigned to bombing exercises. The next time you visit Jarvis I'll get you a hop in a bomber so you can see how a bombardier is trained.

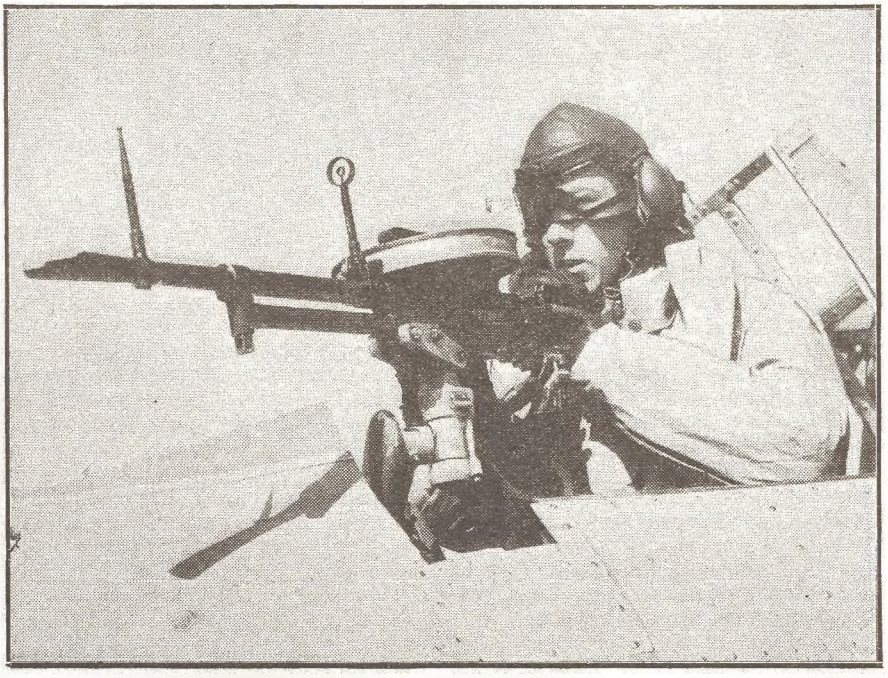
We are on the flying line now. See how that ground crew swarms over the plane, preparing it for the next pilot to take out? Maintenance is an important job in the RCAF, too.

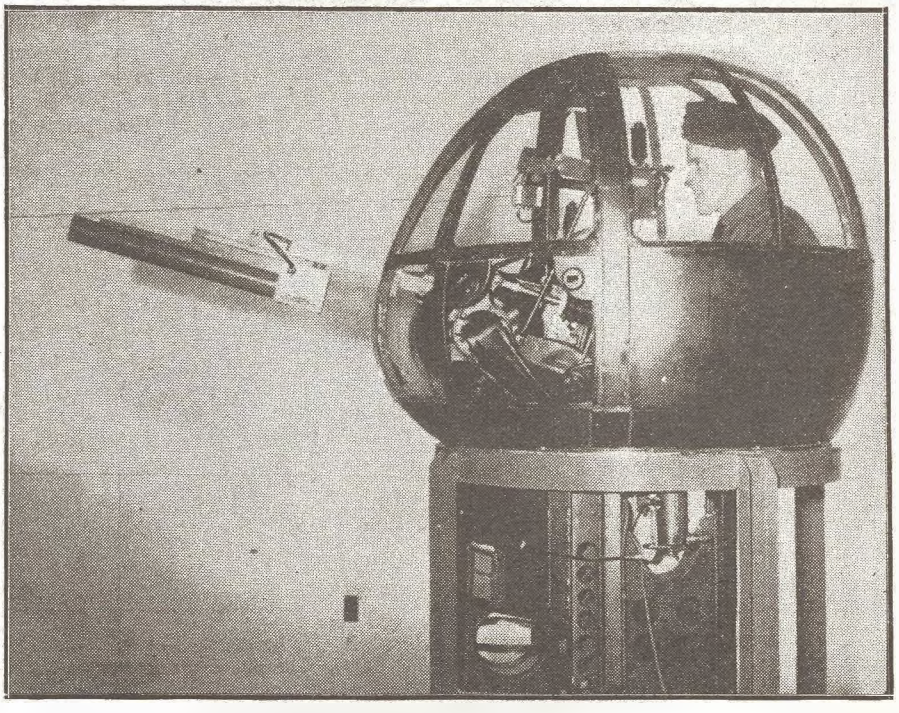
I hope you now have a fairly good idea of how an air gunner is trained, but don't think the "Wag" is finished when he leaves here for overseas. He has to put in 25 hours of combat training at an Operational Training Unit when he gets to England. There he learns how to operate one of the famous four-gun hydraulic gun turrets with which most bombers and scouting planes are equipped. Then—he'll try live ammunition against a live target in the form of an enemy.

The air gunner you flew with will also have a good chance of getting a commission as an officer; he will be a sergeant when he graduates from the course in Canada. About five percent of all air gunners get commissions in Canada and another fifteen percent are commissioned on arrival in England. This does not compare as favorably as the percentages of observers and pilots who receive commissions, but if you think that bothers them, read these verses—the gunners' theme song:

I wished to be a pilot,
And you along with me.
But if we all were pilots
Where would the Air Force be?
It takes *guts* to be a Gunner,
To sit out in the tail
When the Messerschmitts are coming
And the slugs begin to wail.
The pilot's just a chauffeur,
It's his job to fly the plane;
But it's *we* who do the fighting,
Though we may not get the fame.
If we must all be Gunners
Then let us make this bet:
We'll be the best damn Gunners
That have left this station yet!

THE END





Single-gun turrets are now outmoded for actual warfare, but they are still used for instructional purposes. Below: After thoroughly mastering the free-swivel weapon, gunners learn the operations of modern power turrets.

On the Light Plane Tarmac

War and the Private Pilot

THE WAR with Japan had no more than started when all private flying was clamped down upon and non-scheduled airline traffic was prohibited. This, of course, was an obvious step, for it was announced that there are 1,300,000 German, Italian, and Japanese nationals in this country. With such a sizable army of possible enemies within our shores, along with the handful of so-called Americans who might be in sympathy with enemy powers, it is more than probable that a goodly number hold licenses. And if private flying had not been stopped, chances are that wholesale reconnoitering of our defense positions, plus even possible sabotage, would develop.

More than 250,000 of these undesirable aliens have been rounded up at this writing, with the F.B.I. and police continually seeking out others. And when the status of these persons has eventually been determined without doubt, we then can probably expect to return to private flying. Until that time, however, such planes will be grounded.

But what will be the future place in the national scheme of the light plane and the light plane flyer? This country has taken to aviation on an ever-increasing scale during the last few years, and the reserve of potential military material is tremendous. Many of these flyers, of course, are not fit for actual combat work for various reasons, but it may be assumed that the majority are not only ready in hours and experience, but are also willing to do their utmost to crush Japan and her Axis partners. The Tripartite nations must be ripped apart—and it's the private pilot of today who will do a lot of that "ripping" if this proves to be a long war.

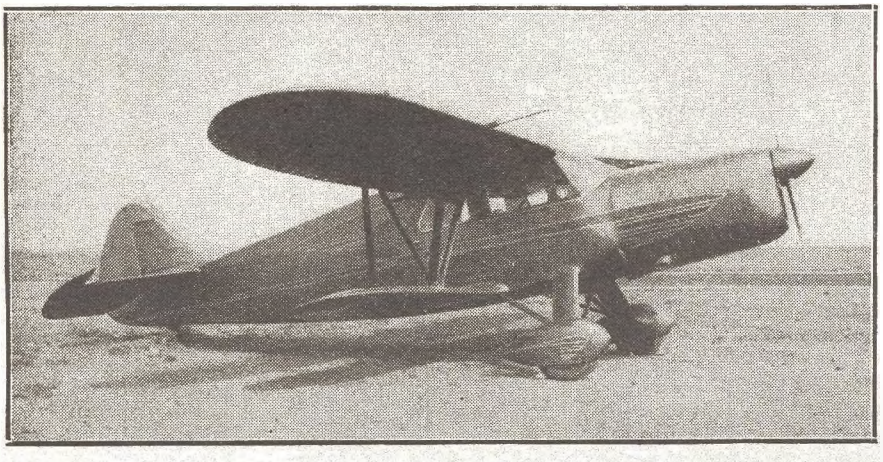
No official word has come out of Washington at this writing as to whether private pilots will be given Active or Reserve commissions in the Air Forces or not, or whether they will be inducted for training in military-type craft. However, it is apparent that in the months to come this step will be taken, in order to supply pilots rapidly enough for our tremendous construction program. Colonel Jouett, president of the Aeronautical Chamber of Commerce of America, recently stated that our aircraft companies turned out 20,000 airplanes during 1941, and that the figure for the next two years will be 100,000. For this number of planes our Air Corps is training only 30,000 pilots a year. This figure, too, will undoubtedly be stepped up. But pilots cannot be trained as rapidly as aircraft can be manufactured.

From the above, then, it seems obvious that as our production effort speeds up it will be almost impossible to fill the cockpits with trained men. The only logical answer is to draw upon the civilian flyers, who in many cases would need only a slight amount of advanced instruction to be readied for military flying. These pilots would undoubtedly be listed in the NCO class, because of their lack of training in military law and component subjects. But when one's country is threatened, bars on the shoulders mean very little.

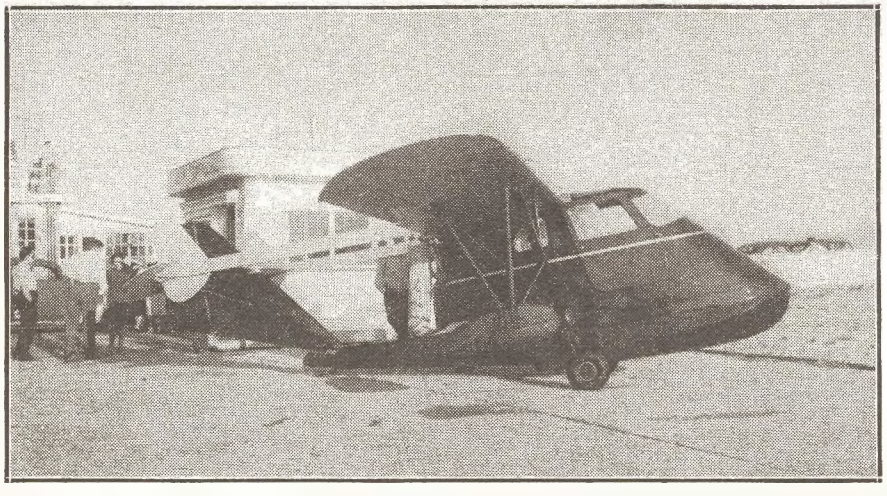
In any event, we're in the mess whole-hog, and it's up to the fellows who dug down into their jeans every Saturday and Sunday to do their bit now.

But what about the operators who are getting kicked in the shins by all this? It's said that many of these have already volunteered their services to the Government as instructors, and those who haven't may possibly be inducted for such work. For now the training problem will become more pressing than ever before, and nearly all of those qualified for such duties will have a place found for them under the new set-up.

Our thousands of putt-putt machines will likewise have military use. At the present, communications, liaison, and air-raid spotting is being carried on by airliners and regular military combat types. But in the future these ships will most likely be pressed into more important duties and the light planes, fully equipped with two-way radio, will be used in their stead.



Menasco uses this Waco S Custom for testing engines. At the time of this test, the job was fitted with a C6-S4 of 260 h.p. Below: Our photographer was unable to learn the name of this new ship. The shot was snapped at Babylon, N. Y. If any readers have information on the plane we would like them to contact us.



CAA Grads Can Fight!

AND SPEAKING of light plane flyers, two-thirds of the American Eagle Squadron in England learned to fly in the CAA's pilot training program, according to word received from Pilot Officer Harold Strickland, a Chicagoan now stationed in London as a member of the Eagle Squadron.

Strickland says he finds it "amazing" that many of the boys, who are now "hitting the Jerries hard, hopped off on their first solo in a CAA Cub about a year ago—and today they can fly a tight formation in the clouds with Hurricanes."

Emphasizing the important lessons to the American military forces of "mass wartime aviation," Strickland stated: "It's a good thing that a res-

This 1942 model of the Porterfield Collegiate trainer may be obtained with either a Lycoming, Continental, or Franklin engine of 65 h.p. Respective maximum speeds are: 125, 100, and 100.

ervoir like the CAA is set up for them to draw from as a starter."

The CAA training program, begun in 1939, has fed more than 10,000 of its students to the Army and Navy air forces, and, in all, has created more than 55,000 new pilots.

Asserting that "I have seen nothing that reflects on the CAA courses," Strickland cites this example of performance by CAA graduates with the American Eagles:

"Yesterday we were on a Squadron search at altitudes. At 25,000 feet we went into a tight formation and flew through the clouds, then let down. When we made contact we were all in correct positions."

VALUABLE GADGETS

PRIVATE-PILOTS-TO-BE studying navigation problems in preparation for written tests will be interested to know about two handy instruments—a definite aid to their work—each selling for a dollar. One is the *Air Navigation Protractor.* This string-type 360-degree compass course protractor is invaluable for every cross-country pilot for laying out his course, measuring wind drift angles, distances, etc. It is made of tough, transparent, non-inflammable cellulose acetate, five inches square, to which is attached a 42-inch-long non-ravelling silk water-proof plotting string.

Rules on the ends of the protractor calculate the distances on Government sectional and regional charts. Compass and rules are scaled very accurately and readings may be taken quickly and easily. The device comes in a strong, thumb-notched carrying container which also has a magnetic variation map printed on it with complete instructions.

The *Flight Calculator* is a double-faced instrument from which pilots can easily and accurately determine the true ground and air speed, speed at any given temperature and at any given altitude. Distances traveled, course corrections, wind correction angles and velocity, gas consumption, and other flight navigation problems are simple to work out. It operates much in the same manner as in a slide rule. This calculator is 4½ inches in diameter and may be easily carried. Both instruments may be purchased from the Jardur Import Company, 21 West 19th St., New York City.

SAFETY BULLETIN

EVEN THOUGH private flying has been banned for the time being at least, we still want to harp on the subject of low altitude stalls and spins. Accordingly, below is reproduced a recent CAB bulletin.

Inadvertent stalls resulting in loss of control at low altitudes continue to account for a comparatively large number of fatal and serious accidents in private flying. Proper technique, however, would prevent nearly all of them. But the unnecessary loss of life and the serious injuries to occupants, in addition to enormous property losses resulting from such accidents, can be stopped *only* if all concerned devote themselves to correcting this serious condition.

Twenty-one reports of such accidents, picked at random, which occurred during the last year, reveal various causes; predominant among them are poor technique, poor judgment, and inexperience. These underlying causes may be attributed in nearly all cases to faulty instruction, inability to remember correct technique in emergencies, or carelessness.

Instructors: Drill your students on the necessity of maintaining *more* than just enough flying speed while in the air. Keep 'em flying by thorough, frequent checks on glides and turns.

Students and pilots: Fatal and serious accidents are occurring because:

1. Engine fails on take-off and an attempt is made to return to the field, resulting in a nose-high flat skidding turn, then the stall and the spin.

If your engine fails on take-off, land straight ahead toward the best place available, but maintain flying speed. Do not stall the airplane.

2. At low altitudes some students or pilots wave and call to friends on the ground, stalling the aircraft because of inattention to their flying technique. Then comes the fatal spin.

If you must do this, keep the nose down and don't make flat turns or steep turns at low altitudes.

3. During forced landings, attempts are made to "stretch the glide" to a desirable landing area, or to turn back after overshooting. Result—stall or spin.

You cannot "wish" your way into a preferred landing area without sufficient speed and altitude. Regardless of where you are, maintain your flying speed until you land.

4. Vanity sometimes prompts the execution of low acrobatics, in violation of Civil Air Regulations.

If you must "show off," regardless of danger to yourself and others, don't make steep turns or flat turns near the ground. Keep the nose down. Respect of the laws of aerodynamics even if you can't respect the law of the land. After all, it is better to be grounded by the authorities for violation that to be maimed for life.

(Editor's note: It has been announced that to continue flying you must submit fingerprints and a photograph to the CAA and prove that you are an American citizen. Flights are limited to a radius of ten miles.)

THE END

Hot Francs!

Phineas was in a mess with the French and knew that he would be cashiered. But then he got a hunch and headed for Germany —because he knew that sour Krauts go well with hot Francs!

by Joe Archibald

"A" FLIGHT, Ninth Pursuit Squadron, U.S. Air Force, was on its way home from a swing around the Boche back-area when it spotted the Frog battle crates having a field day with two Rumplers and three Heinie escort ships. One of the Krauts was already on his way tc the cleaners and another was staggering out of the fuss with an aileron flopping like a very sore hangnail and with a fuselage thatwas getting nude. The Rumpler was trying to get into a cloud and lose itself, but a Nieuport smeared it and wrote it off the Potsdam books.

Lieutenant Phineas Pinkham knew the Frenchy who was in the Nieuport, and his own fuel pump became as heavy under his wishbone as a bride's first waffle.

"He is a lucky stiff," Phineas sniffed, as he headed for the fray, hoping that Captain Howell would get at least one Heinie before the curtain dropped.

It had happened three months ago during a binge in Bar-le-Duc. The Frogs and the Yanks had taken over an estaminet to celebrate Captain Howell's fourteenth triumph over Boche crates. The pilots of the Ninth Pursuit Squadron had indulged in plenty of crowing, and Phineas had been the chanticleer with the loudest pipes. The Boonetown miracle man had orated at length regarding the superiority of United States flyers and he had become very personal with it all. He had been particularly brutal with the verbal knife when he had singled out one Lieutenant Jules Burbonne.

"Why do you think Lafayette yelped for us to come over, huh?" Phineas had ululated. "Because he knew the Frogs were not good enough to lick the Krauts. Haw-w-w-w-w-w! Look at our skipper here. He has fourteen *descendus*. How many of you snail punishers have as many?"

One word led to another. They piled up until Jules Burbonne had risen to his feet and had thrown a wager into the faces of the flyers of the Ninth Pursuit.

"So!" had roared Burbonne. "I am seek of ze eensults! I mak' ze game to play between *Deuxieme* Group, *Avions de Chasse*, an' ze Ninth Pursuit Group, *oui!* I mak' ze bet I shoot down more planes in ze *guerre* zan does your *Capitain* Howell. Ten thousan' francs is ze bet an' ze squadron that loses she has to pay ze one zat wins. Bah! You weel be afraid to tak' ze bet!"

"Oh yeah?" Phineas had howled. "It is a bet. We will put it in writin'. I will sign for the whole squadron. Where is paper and pencil, M'sewer!"

It had been a reckless bet, but the pilots of the Ninth had been a little foggy from vin blanc and rouge, and it had not been until the next evening that they had fully realized what they had let the brash Pinkham do to them. Three weeks after that, they were plunged in gloom thicker than the mud in the road that snaked past the drome. For Jules Burbonne had begun to go to work on Heinie scraposphere stock with a vengeance. He had begun to make air history, and the natives of France were beginning to forget Guynemer.

The Oberstleutnant shot a quick look at Phineas' fuselage. "Zo" he rasped out. "You are a criminal, nein? Der dagger on der back—idt giffs der proof!"

NOW, as the Ninth Pursuit group went into help mix it with the Krauts, Burbonne was six planes up on Howell and Phineas was pretty sure that Burbonne had added one or two since the sun had come up. Phineas was also aware of the fact that the entire blame for the reckless bet was sitting right between his angel bones and that he was becoming as popular in and around Bar-Le-Duc as a musteline mammal with halitosis.

Phineas saw Captain Howell try for a Kraut Pfalz that was skidding out of the path of a Nieuport's guns. But another Nieuport nearly crashed into the skipper, and before Howell could get his Spad out of an adagio dance the Boche plane was washed up —and it had been Lieutenant Burbonne who had done the laundering! The three remaining Heinies made a run for it and the fight was over.

The pilots of the Ninth Pursuit got out of their Spads on the home drome and gathered about the battle-scarred sky buggies for a conference.

"You can add two more to that Frog's count," Bump Gillis said gloomily. "Ten thousand francs. That is about five thousand bucks in U.S. argent, Phineas. We will be paupers when this war ends. You signed the papers, you crackpot, and got us into it. You better find a way out."

"He sure had better!" Captain Howell bit out. "Anyway the Frogs do not play fair. I had that Kraut dead to rights when they blocked me off."

"I am thinkin'," Phineas grunted. "I been tryin' to figure a way to save the old homestead for days now. I have not been stayin' alone in my Nisson like a Monk for hours at a spell for nothing. That snail guzzler has a lot of war to fight yet. I am going to see the C.O and make a protest."

"Huh? What for?"

"He will not let you fly free-lance like the Frog C.O. lets Burbonne," Phineas yelped. "The Frog has cart blanche with his Nieuport and can go hunting Heinies any time. I wish we had made the bet different. Counting quality and not quantity, as then I would be a cinch to win. All my nine victories was big vons."

"Yeah, go and tell Garrity," Howell snapped. "You are just silly enough to go into a bear's den with a

Phineas got up in his office, spun around, and got his big hands on the Heinie's throat. "Haw-w-w-w!" he roared. "So you was gonna double-cross me, nein? Take that, Herr pal!"

willow switch and steal a cub."

Phineas Pinkham walked over to the farmhouse and entered Major Rufus Garrity's Operations Office. The C.O. was having an argument with the Equipment Officer and kept banging the tip of his cane against the floor to emphasize his points. When he saw Phineas he tossed his stick to the table and glared at him.

"What do you want?"

Phineas told the Old Man while the E.O. discreetly slipped out of the room.

Garrity roared: "Let's change the war around for Howell, hah? I'll notify Foche and Haig and Pershing immediately. We will all go home except Howell and Burbonne, and that will be nice. Look, lame-face! You made your bet and now you can lie in it. Why you've got more nerve, Pinkham, than a jumping wisdom tooth. You dare to come in here and ask me to—" Major Garrity heaped his outburst on Phineas for fully five minutes and Phineas absently picked up the C.O.'s can and ran his finger over the tip of it while he took the verbal typhoon.

"Put down that stick!" Garrity howled when he had run out of insults.

"I just asked," Phineas sniffed. "It will be a cold day when I ask for more favors from anybody." He stalked out and slammed the door. The Old Man banged the tip of his cane against the floor. The floor seemed to explode and the stick jumped out of his fingers and caught the Recording Officer right on the chin. Major Rufus Garrity had pancaked and from a sitting position, and was sniffing at the ring of smoke that was giving his noggin a halo.

"I'll kill him!" the Old Man swore.

"Them percussion caps are the strongest I ever tried," Phineas grinned as he legged it to his cubicle."

Just before mess, a Renault job rolled into the drome. The C.O. of the French outfit and two pilots got out of it. The pilots sought out Captain Howell and found him in his Nisson playing Hearts with Phineas and Bump Gillis. One of the Nieuport chauffeurs was Lieutenant Jules Burbonne, and the Frenchy was in a nasty mood.

"We come to tell you somezeeng, *M'sieurs,*" Burbonne snapped. "Keep out of ze air battles zat is our, *comprennez vous?* Today, you try an' steal ze victories wheech belongs to us. Like you say in ze Eengleesh, stay on ze outside of your own fence! *Viola!*"

"Awright," Phineas yelped. "An' don't you dast stick your snoots in our fights upstairs, then. And do any of you want a good bust in the nose now? For three cents I would knock you—"

Bump Gillis tossed three coppers to the table. "Mercy, bowkoop," Phineas said, then hung one on Burbonne's prop boss. The other Nieuport pilot tried to pick up a bootjack to hit Phineas with, but Captain Howell picked up the Frog first and threw him out through the door. The Nisson seemed to turn around three times before Burbonne was finally tossed out to make a crash landing on top of his flying mate.

"Zat ees enough!" Burbonne howled. "Now eet ees war! Bah, ze Americains are ze bad losers, *mon ami.* Already I have seven more Boche zan ze Yankees. For ze black eye I weel get ten thousan' francs for ze *Deuxieme Group.* Ah, *Sacre Bleu!* Peegs! Dogs! Mules!"

"The worst part of everything," Bump Gillis moaned just after the Renault had rumbled out of the drome, "is that this Burbonne is not a real Frog. He was brought up in the U.S. like us. That should make the bet illegal. I will see a lawyer."

PHINEAS got to his hut late. After painting his knuckles with iodine, he sat down to think. There just had to be a way out. Days had gone by since he had pulled what he believed was an ace out of his sleeve, but it did not look as if he would ever play it. There was the big book on the shelf that had slipped him the possible trump card. It was *Famous Criminals of France,* by Inspector Gaspard LeRoux of the French Surete.

"It is the craziest plan I ever had," Phineas admitted as he mused. "But this Frog is a guy who is afraid of nothin' and must have a mother-in-law to go back to live in the same house with or a death penalty waitin' for him in some courthouse. No bum fights like he does unless he does not care to live. But if somebody says to me, 'Phineas, when the *guerre* is over there is a deposit waitin' for you in the Guarantee Trust worth a million bucks,' would I take chances of gettin' killed?"

Phineas wondered what the trouble was with the U.S. mails. He guessed that they had gone back to

the stagecoaches and pony expresses. That letter he had sent to a pal in Montreal, Canada, enclosed in another letter, should be back in France somewhere. There was a box of stationery in the Pinkham trunk. On the box it said:

FOOL YOUR FRIENDS. Use Leech's Labeled Letterheads for different occasions. Great Fun. 75c per box.

Twenty hours later, word came in from the French outfit that Lieutenant Burbonne had knocked down another Boche. The mess of the Ninth Pursuit was gloomy enough, without having a brass hat from the Wing bent over a dish of chow near Major Garrity.

"We've got orders to watch all Boche observation crates," Major Garrity snapped. "They have got to be kept out of sector 'K,' where preparations for a push are under way. Lot of camouflaging going on there, and if the Heinies get pictures before it is finished we'll be in a kettle of smelts. That's our job and we must work in close cooperation with the French outfits. Remember this, all of you! It is possible that the Allies will suffer a telling blow in the sector if Boche camera crates get pictures! On your shoulders rests the success of a late Spring drive."

"Rah Rah!" Phineas yipped. "A long locomotive cheer for our good old coach. Excuse me, as I am expecting some mail."

"I do not like such insolence, Garrity," the Colonel from Chaumont said. "Why, I never witnessed such lack of discipline. I will report this man's conduct, Major. You, of course, are responsible!"

"Will you forget the report?" Garrity snapped. "If I tell you I am going to knock his brains out just after I have finished this mulligan?"

"Er—don't go too far, though, Major," the Colonel gulped.

Phineas came back into the room. "I've lost somethin'," he said. "It is a pet I got from a pal in Bordeaux. It come in a bunch of bananas he was unloadin'. He sent it to me as a surprise. I had it in this shoebox I am carryin'. It is a tarantula."

The room was cleared in less time than it takes to say "Boche." Everybody began to shake themselves and then started to undress right there on the tarmac. Phineas came out, grinning like a hottentot sentenced to spend thirty days in a watermelon patch. "Haw-w-w-w-w, I got it. It is only a mechanical one. I bet the guy who put it in the bananas was some relation to me. Why, you have stripped down to your skivvies, Colonel? Tsk-tsk!"

"When you go to knock out his brains, Major," the man from Chaumont said, "let me have a baseball bat, too. I'm gettin' out of here."

"Here is your pants," Phineas said.

Halfway to Chaumont, hours later, the Colonel had to be helped from the boiler. Again he disrobed and took an inventory of his pantaloons. He found at least a dozen big black ants putting up a fight against eviction from their new home.

PHINEAS received his letter the next day. He destroyed the envelope and went out in back of Buzzards' Row and smeared the letter with dirt. He tore it in a couple of places. Then he pricked his finger with the penknife and saw that a couple of drops of his precious blood landed on the paper. "It might work," Phineas gulped. "From now on, I got to think fast. This is the ace which should destroy the insensitive a guy has to fight the whole Boche Circus."

"A" Flight went out the next morning and combed Sector "K" for Boche snappers. They chased a Rumpler before it could get set for mugging the

The Nisson hut seemed to twist around three times before Burbonne was finally tossed out!

Frog carpet. They got into a brief spat with a pair of Albs, and Phineas apparently stopped some Krupp spittle with his Spad, for he did not accompany Howell and his men back to the drome. He made a landing near some rest billets in a small crossroads town that Rand-McNally snubbed when maps were made. At one time, Boche shells had swarmed into the place as thick as locusts.

Phineas arrived at the Ninth Pursuit hours later and reported that his gas line had been nicked and that he had had quite a time patching it up.

"A funny thing," Phineas said in an estaminet in Bar-le-Duc that night. "I found a Frog's brief case that was maybe left behind when the Boche moved in there. I guess the Frog was a lawyer and belonged to the Intelligence Corps, or somethin', as he was carryin' this letter with him."

Two tables away, Lieutenant Jules Burbonne and three companions maintained a stony reserve. They wanted no truck with the Yankee pilots.

"It is a letter from a firm of lawyers in Montreal, Canada," Phineas told Bump. "It says they are looking for an heir to a million dollars. The lawyers claim the guy is the last of a certain branch of the Bourbons and has a mark on his shoulder that will prove he is. Haw-w-w-w-w-w! You are Scotch, Bump, and that is a kind of whiskey, too, huh? The C.O. always has a rye face and all Sergeant Casey does is whine. Just as soon as Chaumont hands out another rum go I am goin' to ask for a leave of absinthe. I could go on like this forever. Haw-w-w-w-w!"

"Let's allez," Bump snapped. "I got to buy me some postcards, and not the kind you think."

Lieutenant Phineas Pinkham left the letter on the table. He brushed it with his elbow when he arose, and it fell to the floor.

"Bon sour, Frogs," Phineas tossed at the Nieuport pilots. "I bet the pool you was sent out of had lily pads on it."

The war went on. Two days later, Captain Howell got himself a Rumpler and two balloons, but he was still six planes and four balloons behind Burbonne. Three days after that, the Flight Leader of the Ninth Pursuit Squadron got two more Boche. Lieutenant Burbonne's total did not change. The hopes of the Ninth began to lift.

"We'll not have to mortgage the old homestead, I bet," Phineas grinned after a brush with the Boche over Sector "K." "The Frog is slippin', huh? I must go into town and see about something. Why, they say Burbonne run out of a scrap with the vons over Conflans yesterday p.m. Twice in four days he has had forced landings."

"I don't get it," Bump Gillis said, scratching his dome.

The Boonetown miracle man went into Bar-Le-Duc and he made his way to a little shop on a side street. On the door was a small sign that said: Jacques LeFarge—Tattooing.

Phineas knocked and was admitted into the presence of an old Frenchy with a beard as long as a bridal veil. Jacques LeFarge had sailed the seven seas and a couple of others that a lot of sailors had never heard about. Jacques picked up a bit of pin argent once in a while by needling little designs on the epidermis of citizens who were so inclined.

"Maybe you had a customer lately?" Phineas asked the old salt. "A Frog pilot, maybe? A little mustache that would hardly be noticed on a bee's upper lip. A nose pointed at the end, huh? I have ten francs that says you never forget any more than an elephant."

Jacques LeFarge took the ten francs and Phineas left the place, marvelling at his own talents in the fine and applied art of skullduggery. The guinea pig had nibbled at the bait. Lieutenant Jules Burbonne had a name that smacked of Bourbon. He had hailed from the province of Quebec and there was a lot of French blood in his veins. Phineas Pinkham knew that Lieutenant Burbonne had written a firm of lawyers in Montreal,

the firm of Snide, Snide & Snider.

"Haw-w-w-w-w," Phineas enthused as he strode out of Bar-Le-Duc. "He has the mark of the Bourbons on his shoulder, too. Now where did I git the idea for that little red dagger? It was in the book. I must read some more of Frog criminals. Well, I will swap a million bucks on paper for ten thousand real Frog francs anytime. Nobody wants to git shot who has a million dollars waiting for him if he does not git shot. In about two weeks, the Skipper should draw at least even with Burbonne. I do not see how we Pinkhams do it."

SOMETIMES the best regulated power plants, mental or otherwise, backfire. Came the momentous morning over Sector "K," near St. Mihiel, when Captain Howell, Phineas, Bump Gillis, and two other Yank pilots spotted the Kraut camera crates. They had no sooner slammed down upon them when twelve Boche Fokker D-7's left their place of ambush close to the floor of Heaven and dropped onto the necks of the Yanks. It looked like curtains. Phineas resigned himself to bowing out of the war, knowing he would never get an encore. A Spad threw in the towel, and then there were only four Yanks left.

Garrity's Spads began to get a terrific ventilating. Bump Gillis crawled out from under with the help of a cloud, and Phineas was thinking up the correct way to address St. Peter and the angels when he spotted the Nieuports.

"We are saved!" Phineas yowled. "Come on in, Frogs, and I will pay the ten thousand francs myself. Why, the dirty bums! They went on over and didn't stop. Oh-h-h-h-h!" Phineas started for home, nearly merged with Howell, who was doing things with a Spad that had never been written up in air books. Bullets hummed around the Ninth Pursuit ships and the Boonetown joker knew that the fuselage of the Spad he was riding looked like a punchboard in a cigar store. It was lucky for Garrity's outfit that the Boche were not in the mood for cold cuts that morning. All they wanted at the moment was the safe return of the Rumplers, and they stopped committing mayhem on the Yank crates and went to nurse the camera buggies home.

Four hours later, Phineas and Bump and their flight leader finally were reunited. Gillis and Howell left their Spads miles short of the drome and marvelled that they had walked away from them. When Phineas put his crate down it completely fell apart. Sergeant Casey, boss ackemma, immediately asked for a transfer.

"The Frogs left us to git murdered!" Phineas howled as he sat down on a twisted wing. "That was Burbonne an' his Nieuports. The Boche got the pictures, too. This is an outrage and we should report such cowardly conduct. Why—"

"It was because they would not horn in on our fight, like they said," Howell mumbled, still a little foggy. "Anyway, that Burbonne has been runnin' away from all tough ones. I wish I—"

"I heard you!" Garrity said. "This is all because of your not cooperating with the French—because of that bet you lunkheads made. Now, see what has happened. Sector 'K' will get a sweet going over. The pictures will show the dumps that are not camouflaged an' the big guns an'—Pinkham, you report to the Operations room right now!"

"Well, I'm one up on Burbonne anyway," Howell said. "Hah! I got a Fokker before we run for it."

"You started this," Garrity accused Phineas. "Chaumont is going to bust things wide open. This outfit is going to be smashed, and I start with you. I am going to transfer you out of here. There is a suicide squadron near Commercy that I have in mind. Anyway, I'm kickin' you out of this outfit. I am through with you, you big ape!"

"You are no rest cure for me, either," Phineas countered. "I was only thinking of the honor of the squadron, and I did it to build up morale. All the guys was worrying over that ten thousand francs, so I fixed Burbonne's wagon—"

"Wa-a-it a minute!" Garrity cut in. "What was you sayin'? You fixed Burbonne? How? So you got something to do with his slump in knocking off Krauts, hah? You tell me what you got on your mind!"

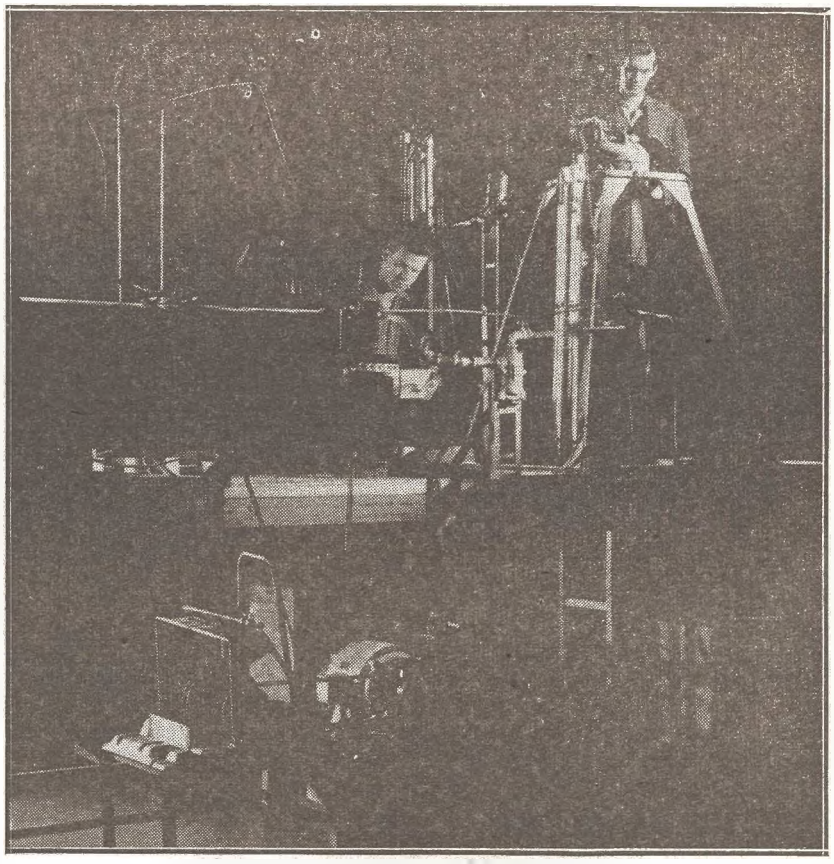
"I will not say one more word as it will be used against me," Phineas said. "As they say in Washington, I have Spokane! Awright, I will go and start packing in case I have to move out quick. Adoo."

OVER ON the French drome, Lieutenant Jules Burbonne was looking at a letter he had finally received from the other side of the pond. It was the one he had written himself, and stamped across the face of it were the red letters: NO SUCH FIRM. Return to Sender.

Lieutenant Burbonne suddenly smelled a rat and he dug into his little writing case for the letter he had picked up in the buvette in Bar-

(Continued on page 73)

Warplane's "Innards"



THIS STRANGE-LOOKING arrangement of tubes is really the complete fuel system of a modern fighting airplane, brought out into the open where it can be studied under test conditions. The picture shows engineers of Vultee Aircraft subjecting the fuel system to widely divergent pressures which would be encountered at various altitudes during a flight. By such methods the American aircraft industry is speeding the building of the world's finest military airplanes to fight off and defeat attacks of our enemies.

Experiences of an Instructor

Regardless of "angles," Joe Alta wouldn't relate his experiences. But our reporter got part of the story anyway!

by Charles Yerkow

WHEN I first drove up to the small Long Island field I had no idea I'd find there a pilot who knew the old gang from Jamaica Sea Airport back in 1930. The name of this field was Queens County Airport, and Jamaica Sea was a short hop from it. Things in general there reminded me of my flying ten years ago, except that the Wacos, Eaglerocks, and Travelaires were substituted almost entirely by light Cubs.

Joe Alta, the fellow I was trying to look up, taxiied the line and I was introduced to him. When you meet someone like that, who knows everybody you know and who flew the kind of ships you flew, it's bound to drag out into quite a talk.

Before I could ask Joe about himself and his flying school, we covered ground from 1930 up, and I learned that my old friend Ernie Marquis was now a check pilot in the Army. Another friend, unfortunately, had been killed about a year ago in an Air Corps pursuit.

"Well," sighed Joe, "that's flying for you. Things keep going ahead and there's always a change-over. Do you remember Harrington?"

I nodded. "He owned a Fledgling."

"Right. I soloed with him and then switched to Elwood and his Eaglerocks. The same ships you flew, Charlie."

Ten years go by, you meet an old-timer and begin talking about ten years ago, and then you feel as if you were someplace like this before and that the ten years had never really passed. You expect one of the old gang to walk into the room any minute and say, "That damned mag on 304 cut out again!"

Joe told me how Harrington kept struggling for flying time, how he finally landed a job with Eastern Airlines.

"You mean to tell me that chubby kid from Jamaica Sea is flying for Eastern?" I asked.

Joe grinned back, "Flying, hell! Harrington is Captain!"

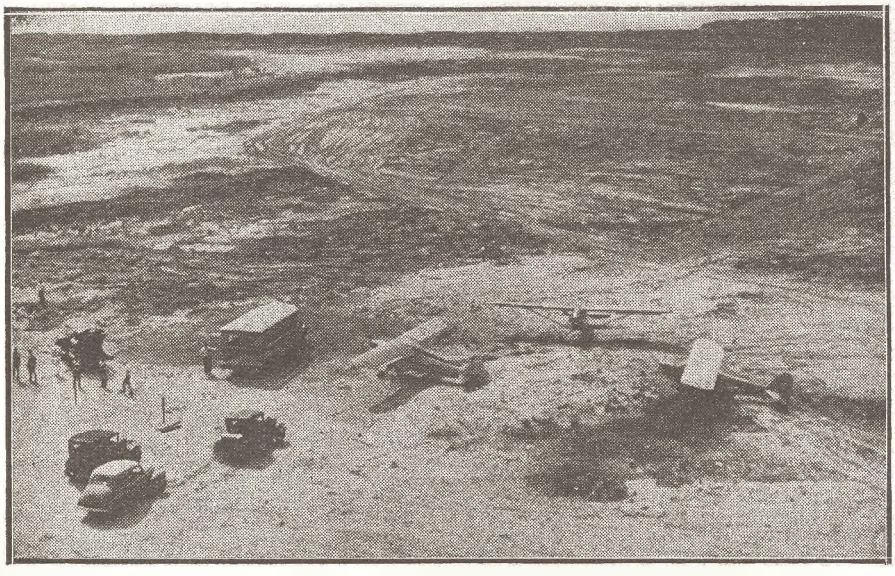
At this point a young chap with very blond hair ran into the office and asked where Roberts was. Joe told him, and the kid—the only name he seems to have is "Whitey"—ran out again. Joe turned to me. "Roberts is of the new gang around here. He's got his ticket and is going up to Canada to try for the RCAF."

It seems the RCAF will give you a fair tryout even if you've only had time in Cubs. Later I watched Roberts handling one of these light planes, and his flying left an impression on me. He made two spot landings not more than ten yards from me and my camera, and both times he got his wheels down in the same spot.

Whitey also left an impression on me; he's about 18 years old and has logged nearly 200 hours. I could appreciate that, and I felt out of place with my "Keep it up, Whitey," advice.

Joe's ships carry the inscription "Alta Flyers," and the students and pilots wear a pair of wings with the same inscription. Girls and fellows come out to the field through the week, especially on week-ends; it's a happy crowd, as mine was ten years ago, and a lot of flying is done.

At this point I'd like to mention two names: Jerry Casper and Mike Foreman. Both men started under Joe Alta in Cubs, flying first from Floyd Bennett, and, after Bennett was taken over by the Government, at Rockaway Airport. Today Jerry is in the RCAF as bomber instruction pilot, and Mike is in our own Army as an instructor. Such a record speaks well for the Cubs and for Joe.



Queens County Airport as it is today. The field is level and is excellent for light plane flying. Below: Just a few short months ago, the site looked like this. Bumpy and muddy, they had just started to put it into suitable condition.

BUT I was after a story about Joe Alta and how he started his flying school. That he learned to fly in 1931 and that he started his school in 1936 was a matter of routine; but the chance remark that his school, lecture room, repair shop, and lounge was in a bus aroused my curiosity.

I asked him about it and he said: "Well, when we first came here to Queens County Airport it was just a big lot with plenty of grass and sand

dunes, so our job was to get hold of a tractor to level off the terrain. The classes had to be held—most of my students from Floyd Bennett had come along with me—so we had to figure a way out. It would have taken time and money to build an office with a large back room. The best bet was to hire a bus."

"It was a novel idea. What did the students think of it?"

"Everybody thought it was swell!"

Today, Joe has a small but comfortable building. The office faces the field and has one large window to afford a clear view of the entire airport, while two smaller windows permit one to follow a ship in flight as it rounds the office and circles for landing practice. In the rear is a large lounge, also with well-placed windows, and on the wall is the familiar Civilian Pilot Training Administration placard and other useful data.

I tried to squeeze a few interesting stories out of Joe, but he grinned and said nothing much ever happens to him.

"Look," I pressed. "You're not talking to a hangar flyer. You know it's next to impossible to get away without something happening sometime. Ever get caught in fog?"

"Sure," said Joe.

"Ever have a forced landing? Not just a motor conking but the kind with oomph in it?"

"Sure," said Joe. "I brought the ship down."

I was forced to angle for a more diplomatic approach, and though I managed to induce him to tell me about a few incidents I still could not get sufficient details. He said, "I was flying in from Lock Haven, Pa., and got caught in a heavy fog, so I eased down and landed on top of a mountain. Next morning I took-off again."

That wasn't much and I said so, adding, "What about that forced landing? It was with a student, wasn't it?"

"Yeah. The motor conked, so we landed."

I should have known better, for no person will tell you what happened to him if they know it's going into a magazine where many thousands of readers will see it. It's the old newspaper saying: "Leave your pencil and pad at home when you're going out on an interview."

When I was leaving the airport I offered to drive one of the other pilots back to the City with me. This time, just by talking about things in general, I got some of those details on Joe's flying incidents.

There was a new ship to be flown from Lock Haven to New York and there was a heavy fog that evening—and there was Joe at the controls, thinking about supper in New York. The fog then got so thick that flying was out of the question. Joe began to hunt for a break in the fog around him and set her down. After some circling he spotted a dark shape looming before him, growing bigger. A mountain! With just enough light to see a clearing, Joe side-slipped in over the trees—and overshot. On his second try he pulled a stunt halfway between a side-slip, fish-tail, and pancake landing, and set her down easy.

These two photographs show Joe Alta lecturing to his students before the airport's office building was erected. A bus was then used as the "office." The field is now somewhat of a haven for light plane flyers of the New York area.

There was now a new ship someplace in the mountains and fog all around, so Joe decided to stay till morning. When day broke through things looked much brighter. Joe was hungry and curious as to where New York was. He climbed out of the ship, stretched, then plotted a course away from the rudder of his plane. Ten yards away and he jumped from his path, picked up a solid stick, and battled it out with a snake.

Instead of returning to the ship and taking off, he proceeded with the stick tight in his hand and his senses on the lookout for anything and everything that even so much as breathed on the ground near him.

Joe's thought was to find someone and find out the name of the place. No one could be found, so Joe retraced his track and headed towards the direction into which the right wing of his ship was pointing. Still he could not find anyone.

After covering all four corners without success, he threw the stick away and got his engine started. A short time later he was in New York.

"You mean to say," asked one of the pilots at New York field, "that you didn't take on any gas from the time you left there?"

"I didn't have time," Joe replied casually.

The other pilot looked at him quizzically. He enlightened Joe as to the tank capacity of the plane, the distance flown, and the effective range of the ship based on fuel consumption figures. "You just *had* to refuel, Joe," he insisted.

Joe is still trying to calculate fuel consumption, distance, and range, in approximate relation to his tank capacity.

ANOTHER TIME, when Joe held a Private Pilot's license and had just bought his first airplane, he persuaded a Commercial pilot to try out the ship. This pilot took-off, climbed up to three thousand, and cut the gun and attempted a stall. Those who

(Continued on page 72)

Chkalov was the USSR'S chief test pilot, and before his death he put seventy ships through their paces. He is seen here climbing into the cockpit of an I.16 fighter.

Valeri Chkalov— ACE SOVIET AIRMAN

From a humble beginning, this flyer became one of the most respected pilots in the Red Air Force

by Ralph Tekel

THE RELEASE in this country of the Soviet movie, "Wings of Victory," on the third anniversary of the death of Valeri Chkalov, who was considered one of the world's greatest test pilots, brings to light some of his outstanding contributions to the aeronautical world. Chkalov, best remembered for his Moscow to Vancouver flight across the North Pole in 1937, was an outstanding figure among Red Army airmen. He is said to have possessed a rare combination of flying ability, engineering genius, and intuitiveness.

Valeri Chkalov was born in a little village along the Volga in 1904, one of a family of seventeen children. He was raised by his eldest sister, and after finishing primary school he went to work as a fireman aboard a river dredging boat, where he displayed great interest in mechanics. Later, he entered a technical school. In the fall of 1920, at the age of 16, he volunteered for the Red Army and shortly afterward received an appointment to the Government aviation "hangar" as an ordinary workman. His superior work advanced him to an aviation school and subsequently to the highest aeronautical school in Moscow. After graduating he received flight training to become a military aviator. Then for a year he studied at the great technical aeronautical institute, Osoaviakhim (comparable to our Langley Field Laboratories). For the next six years he was the Soviet government's chief test pilot and consultant on long-distance and fighting aircraft design.

During this time, Chkalov made a survey flight of 5,821 miles over the North Pole. The data accumulated was studied to establish an air route between Russia and the United States. And as a result of this successful trip he made application to the highest authorities for a nonstop flight from Moscow, across the Pole, and down Canada, to San Francisco.

Stalin was in a humorous mood when Chkalov visited the Kremlin. "Feeling cramped again?" he asked. "Getting ready to start off on another flight?"

"Yes, Comrade Stalin," answered Chkalov. "The time is propitious."

Stalin asked for more details as they went over the route very carefully, and then said: "So you think your machine is the right choice? There's only one engine, we mustn't forget that."

"But it's a first-class engine," reminded the aviator. "Furthermore," he jested, "with one engine the risk is one hundred percent. With four engines, it's four hundred percent!"

Stalin laughed, then became thoughtful. "I'm for it," he finally said, "but I propose to obligate you to make a landing in Canada if there should be the slightest danger."

GUIDED by the experience they had acquired on their preview flights, Chkalov, Georgi Baidukov—one of the best instrument flyers—and Alexander Belyakov—unrivaled in aerial navigation, decided to make a few additions to their huge single-motor craft designated NO25. The compression ration of its 900-h.p. engine was increased to produce an appreciable economy in its operation. Oil tanks and a lubricating system were perfected, and they added a new type radio compass. Finally, a gas analyzer was installed which permitted the pilot to regulate the fuel mixture to suit the particular flying conditions they expected to encounter. The Institute of Aeronautical Medicine developed foodstuffs to sustain them for a long period of time should they be forced down in the Arctic wastes. Various American and Canadian governmental agencies took active part in assuring the safety of the trans-polar flight. This project, so thoroughly planned, had arrested the attention of aeronautical scientists and laymen alike. The Papanin weather station, which was drifting on an ice floe in the upper polar regions, was to broadcast weather reports every three hours.

The take-off on June 18, 1937, with one of the greatest of gasoline loads ever stowed aboard a plane, was made without a hitch. Whereas the first half of the flight from Moscow to the Pole was more or less familiar to the three airmen, the second half along Arctic wastes—termed by the American explorer Stefanson, as the "Pole of Inaccessibility"—lay before them as the most difficult stretch.

Shortly after passing the Pole, without being able to contact the drifting weather station because of heavy fog, the plane began to take on ice. The engine vibrated with a slight tremor. A shot of anti-freeze mixture and the engine quieted down to a steady purr. The ship forged its way through solid masses of suspended mists while the thermometer registered 24 degrees below zero. Flying at 13,000 feet, breathing became more difficult and oxygen had to be used.

(Continued on page 80)

JOIN THE FLYING ACES CLUB

Honorary Members

President and Mrs. Franklin D. Roosevelt
ex-Vice Pres. John Nance Garner

Casey Jones	Rear-Admiral Byrd
Wallace Beery	Col. Eddie Rickenbacker
Al Williams	Colonel W. A. Bishop
Col. Scaroni	Major G. A. Vaughn, Jr.
Major von Schleich	Willy Coppens
Lieut.-Col. Pinsard	Glenn L. Martin
G. M. Bellanca	Walter H. Beech
Capt. B. Sergievsky	Zack Mosley
John K. Northrop	Dwane L. Wallace
Colonel Roscoe Turner	Josef Veltjens
Charles W. A. Scott	Col. A. P. de Seversky
Richard C. DuPont	Donald W. Douglas
Maj. A. W. Stevens	Major C. C. Moseley
Capt. O. A. Anderson	Clarence D. Chamberlin
Major Fred Lord	Mrs. Charles S. Baylus
Lieut.-Col. Theodore Roosevelt	

Official Charters

F.A.C. Flights and Squadrons are recognized at GHQ only after they have received their official charters. These illustrated documents, printed on fine paper and portraying various features in the field of aviation, are excellent for framing and display. Their inspirational text is in keeping with the high ideals and aims of our Club. Each charter application must include a full list of proposed group members and their addresses. Each of these members must hold his regular F.A.C. card, obtained by clipping and sending in the membership coupon printed on this page. If applications are approved, Flight Charters are issued for 25c, and Squadron Charters for 50c. Send the correct fee with your application. It will be returned if the Charter is not granted.

WIN YOUR WINGS

Save This Whole Coupon for
CADET OR PILOT
insignia of the F.A.C.

Gold finish — *Actual size*

All members with Official Membership Cards are eligible for Cadet Wings. This coupon, with two others and 10c, entitles members to Cadet Wings. Do not send this coupon alone. Save it until you have three. Then send them in all together with a self-addressed envelope and 10c to cover cost of wrapping and mailing.

Silver finish — *Actual size*

All enrolled members who have won their Cadet Wings are eligible for Pilot's Wings. This coupon, with four others and 10c, entitles Cadets to Pilot's Wings. Do not send this coupon alone. Save it until you have five. Then send them all together with a self-addressed envelope and 10c to cover cost of mailing.

Send the Whole Coupon

regardless of which kind of wings you wish. Separate sets of coupons are needed for each insignia. Canadians send 15c, or three International Reply Coupons. Overseas readers send 1/-, or five Reply Coupons secured at the Post Office. Only one pair of either kind of wings to a member. If yours are lost, send 25c for new ones (2/- overseas). [32]

Do Your Full Share to Advance Aviation

TO advance the cause of aviation, over 50,000 men and women, boys and girls, have banded together to form the FLYING ACES CLUB.

It is the easiest club in the world to join. Just clip the membership coupon, fill out, and mail it to GHQ with a stamped, self-addressed envelope. Your official card will then be forwarded to you. After joining, you can quickly win promotion and the right to wear the various insignia of the Club.

In the FLYING ACES CLUB there are two kinds of local organizations, known respectively as Squadrons and Flights. A Squadron must have eighteen members, including its leader. A Flight must have a total of six. You can start either of these groups in your own community by enrolling your friends in the Club, then applying for an official charter as detailed in the column at the left. *Each member must hold an F.A.C. card.*

Meetings and activities are conducted among the squadrons and flights according to the wishes of the members. GHQ has established no rulings in this respect, nor are there any dues or red tape whatsoever. The entire idea of the Club is a common meeting ground in an international organization for the lovers of aviation in its various phases. Many local Squadrons and Flights hold regular contests and public events. Many hold weekly meetings for model building, and instruction, and even regular flight training.

Awards and the Aces' Escadrille

After the membership card, and Cadet and Pilot's wings, comes the Ace's Star. This is awarded for enrolling five new members, using, of course, a separate coupon for each. As an Ace, you are then eligible for membership in the FLYING ACES ESCADRILLE. Then you may win truly handsome awards. Among these are the Distinguished Service Medal and the Medal of Honor, two of the finest decorations that have ever been designed.

Any member who has reached the rank of Ace is eligible for membership in the FLYING ACES ESCADRILLE, an advanced organization which replaces the old G-2 unit and opens the way for participation in a definite program contributing to the forward movement of aviation.

To enroll, an Ace must apply direct to Escadrille Headquarters, giving his name, age, address, rank, and highest award already won in the Club, and enclosing a stamped, addressed return envelope. If he is approved for membership his instructions will be forwarded. Membership in the Escadrille is limited to American and Canadian members only, at present.

Every loyal Clubster should wear a pair of these official embroidered wings. Done up in the regulation colors of the FLYING ACES CLUB, blue and gold, the wings measure 4⅜" from tip to tip and are 1¼" high. The letters F.A.C. are neatly embroidered in gold in a semi-circle against a blue field piped with red.

They're just the thing you want to sew onto your sweater or lumber jacket, and they stand out against any background. Order your wings now. The price is 25 cents. Enclose a self addressed and stamped envelope with your order.

Keepers of the Log

In order to keep in touch with GHQ, every squadron should appoint a member with a facility for writing as Keeper of the Log. It shall be the duty of the Keeper of the Log to send in regular reports of interesting doings of his squadron. His is an important job, because it is only by means of interesting squadron reports that life can be given to the Flying Aces Club News.

Photographs, too, are an important consideration for the Keeper of the Log. Either the Keeper himself, or any other member with a camera, should keep a photographic record of the squadron's activities, for reference purposes, to show prospective new members, and to allow a selection of pictures to be sent to GHQ for reproduction in our monthly Club News pages.

The cost of film, prints, etc., would be a legitimate charge against the squadron's own treasury or could be covered by members' contributions. A number of flights and squadrons, incidentally, send us prints which have been taken, and completely developed and printed by foto-fan members of the outfit.

Correspondence

In all correspondence with GHQ where a reply is desired, enclose a stamped, self-addressed return envelope with your leter. GHQ receives thousands of letters weekly, and cannot undertake to answer those who do not heed this rule.

Official Supplies

We also have a new supply of swell embroidered wing insignia that'll look top-notch on your sweater. They're made of the official Flying Aces Club colors, blue and gold, and are available at 25c each. Order now before the supply is exhausted.

March Membership Application

I, the undersigned, hereby make application for membership in the Flying Aces Club. I agree to live up to its rules and regulations; to foster the growth and development of aviation; and cooperate with all other members in the work of spreading aviation information, building up confidence in flying for national defense and transportation. I will aim to build up the Club and its membership, and do my best to win the honors that the Flying Aces Club offers.

My name is .....

Age .....[32]

Street .....

City .....State .....

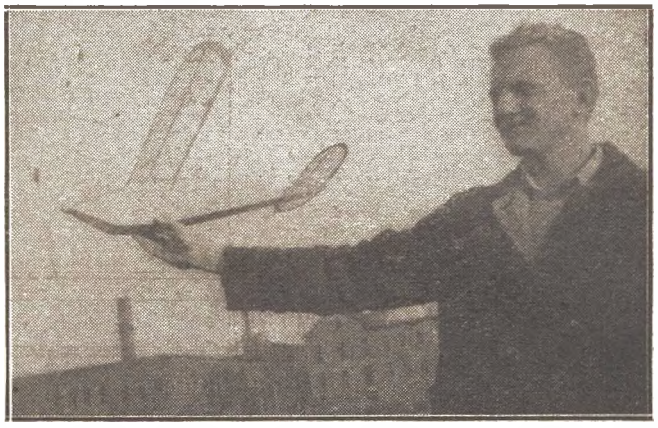
Do you build airplane models? .....

Mail this application, enclosing a self-addressed, stamped envelope. Canadian and overseas readers send the application, self-addressed envelope, and an International Reply Coupon worth 5c, secured at the Post Office.

FLYING ACES CLUB, 67 W. 44th St., New York

Flying Aces Club News

by Clint Randall
National Adjutant, Flying Aces Club



Second D.S.M. award goes to Ernest Soehren for this "Paraplane".

WITH THE EVER increasing number of members joining up with the FLYING ACES CLUB it is best that we devote a large portion of this meeting to the what-to-do's and what-not-to-do's as far as membership details are concerned.

In the first place the question of how to become a member, comes up. One can become a member of this organization by simply cutting out the coupon found on the page titled "Join the Flying Aces Club." He fills this out and sends it in to this office. In due time he receives a membership card and his name is listed among the many other thousands of members who have pledged themselves to do whatever they can to stimulate interest in aviation and promote it generally.

In order to obtain a pair of wings, let's say the Cadet Wings, the member, and he *must* be a member first, cuts out three coupons, one from each successive F.A. issue and sends them along with a dime (10 cents) and a self addressed, stamped, envelope to the Club Headquarters. For a pair of Pilot Wings he clips five coupons and sends it along with a dime and a self-addressed stamped envelope. By return mail, you will receive these metal wings. If you are joining up as a member and want both sets of wings, simply send a total of eight coupons, the membership application, twenty cents, in stamps or cash, and a stamped, self addressed envelope at the same time with your requests. The important thing to remember is to send that *stamped and clearly addressed envelope*. Many letters are returned to us by the Post Office Department because the addresses on them are illegible. The money should be wrapped well or cemented to a piece of cardboard.

Don't worry about delays. We receive a great number of letters each day and it takes time to fill out all orders. For a pair of official F.A.C. embroidered wings, the cost per pair is twenty five cents. You must be a member in order to wear this pair of wings. There is no set pattern to follow in obtaining your F.A.C. credentials. You may order all the supplies listed above at one time or one thing at a time.

There is no longer a supply of "Official Supplies." Because of the prohibitive cost of paper these days, the sale of pennants and stationery has been dropped. It is not likely that the use of these will be re-issued after the war period is over.

Official charters are supplied in the following manner. Any group of F.A.C. members who number not less than 6 steady members compose a "Flight." As a Flight they may receive official recognition from Club Headquarters by requesting a Flight Charter. The way to go about obtaining this is to vote upon a name from which time your Flight will be officially called. Send the sum of twenty-five cents in cash or stamps to this office with a letter giving a list of names of the members and the name chosen for your Flight. By return mail you will receive a charter with the Flight's name noted thereupon and your organization officially recognized.

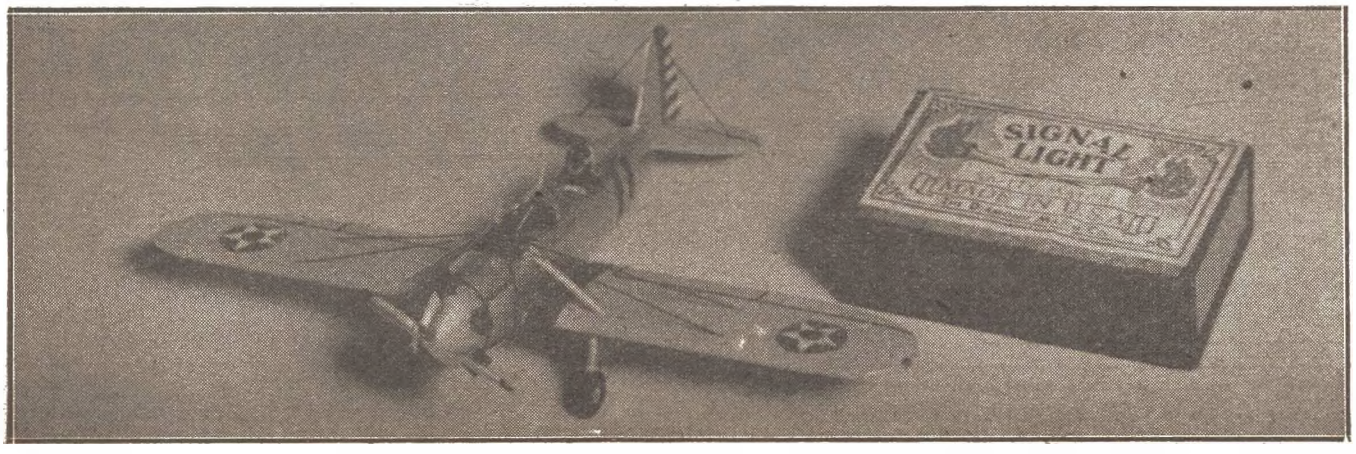
For a squadron, a larger charter has been prepared and the cost of this is fifty cents—either cash or stamps. To obtain this charter, a squadron must have no less than 18 members. Send all 18 names and the name chosen for the Squadron. By return mail you receive a hand lettered Squadron charter and will be officially recognized in your state.

It is a sad state of affairs but nevertheless the following is true. Because of the scarcity of metals—all of which is needed for military production, FLYING ACES CLUB has had difficulty in obtaining additional medals—which are distributed as Distinguished Service Medals and Medals of Honor. For the time being, such medals, with the exception of the D.S.M., are being dropped.

AS FOR THE ESCADRILLE. To become a member of the Escadrille, one must have the Ace's star. This star cannot be bought. It *must* be earned. To earn this, you must enroll five new members. This is the way you do it. Get five of your buddies to clip the membership coupons out and fill them in as required. Then collect all of them and send them to Headquarters with a letter telling that *you* are responsible for getting the five new members and you're entitled to your Ace's Star.

By return mail you will receive five membership cards and your Ace's

This is Jimmie Gaston's Ryan solid scale and D.S.M. winner for this month. Deserves it, too.



This gruesome looking hand really has the nimble fingers that made this built-up Fokker D-7!

Star. This Star constitutes an Award. When you get these cards, distribute them to the rightful enrollees. From there on, all the new members are on their own and each one can try for an Ace's Star by doing the same thing.

To become eligible for the Escadrille one must be an Ace. To enroll in the Escadrille, one must apply in writing direct to Club Headquarters giving his name, age, address, and the highest award already won. This must be accompanied with a stamped, self addressed, return envelope.

If the request for consideration as a member of the FLYING ACES ESCADRILLE is approved by the Board composed of your N.A. and the general staff of FLYING ACES, notification will be sent to him by return mail promptly. Membership to the Escadrille at present is limited to Americans and Canadians only. The Escadrille notification gives you the full dope on how to carry on with your assignments.

Members of the Club are requested to write in to Headquarters telling us of their individual accomplishments and this should be accompanied by proof or a signed statement of what they have done in the interest of aviation. Photographs of club groups for publication in these pages are also welcomed. They must be clear and distinctive.

Of course, there's the D.S.M. award each month. In some cases two awards are made when ties are inevitable. And while we're on the subject, we'll get down to the lucky chaps who win this month's Distinguished Service Medals.

THE FIRST CHOICE for the coveted D.S.M. selected by the Judges Wing Commander Dave Cooke, Model Editor, Jesse Davidson and your N.A. goes to James Gaston, of 57 Tuxedo Road, Montclair, N. J. His little Ryan solid scale posed alongside that match box was made from three view drawings which appeared in our July 1941 issue. It has a wing span of 5½ inches and is 3¾ inches long. It incorporates details such as flaps, elevators, ailerons, rudder, and motor inspection plates marked off in black lines. It also has a pilot whose height is only ¼ inch! As you see, the photo is also excellent which does the whole thing justice and went a long way to impress the judges in that manner.

The other lucky D.S.M. winner is Ernest Soehren, of 933A Summit Avenue, Jersey City, N.J. His photo showing the carefully built "Paraplane" was made from plans appearing in the November 1941 F.A. The chap holding the model in the photo is not Ernest but a friend. Not only is the craft well built but an able flyer, too. This is the first time as far as this department can recall of two fellows winning the D.S.M. who reside in the same state—and so near each other.

So congratulations, Clubsters, well done! And for you other fellows who might be a bit envious and think you can do just as well with *your* D.S.M. entry, why not have a try at it?

Easy, as you know. All you have to do is to send us a clear photograph of any model built from plans which appeared in FLYING ACES regardless of the date of the issue. Tell us in your entry letter some details about its construction or how well the ship flies. Address your letter to the D.S.M. Contest. When the end of the month rolls around, the three judges start opening up all the entries and really pull them apart. Each one gets a close scrutinizing and when the choice narrows down to the "selectee" we really picked out the best of the best—and if a tie is the result, as it has been in the last few months, then two lucky fellows are notified.

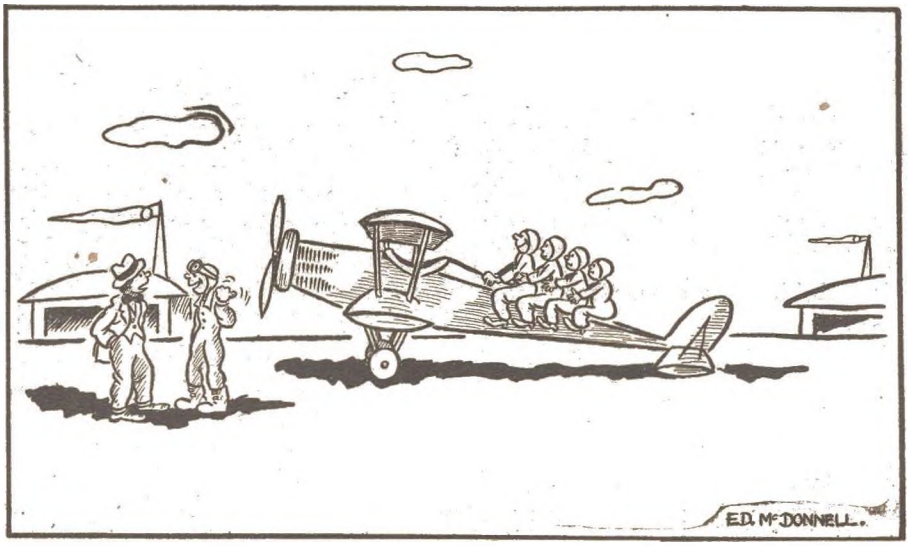
The contest is open to all members of the FLYING ACES CLUB, young and old. Winners of the D.S.M. are invited to try again. If they should, perchance, win a second time, a bar is sent to them so that it may be pinned on their medal ribbon. This citation indicates he is twice a winner.

THAT HAND against a black background is not ready to crush the daylights out of the poor little Fokker D-7. Rather, it is the work of art of Clubster Leonard Holt, of 450 North 7th St., East St. Louis, Ill. Leonard tells us that the little model has a 1 15/16 inch span.

(Continued on page 70)

Meet Claude McCullough from where the big potatoes grow.

"The bob sled team of State College wants me to take them up."



All Questions Answered

Harold Wright, Birmingham, Ala.: —We unfortunately made a mistake in the answer to your question appearing in the January issue. Instead of the *Akron,* the airship in question was the *Los Angeles.* Both the *Akron* and *Macon* were destroyed during storms at sea.

Ronald Gravelle, Cleveland, Ohio: —Yes, it was an oversight in the January issue that we did not mention the price of *War Wings.* The book can be obtained from the McBride Publishing Co., 116 E. 16th St., New York City, for $2.75. All copies ordered by FLYING ACES readers will be autographed by the author. If you have ideas for model planes, contact the Model Editor at our New York address.

Wayne Johnson, Winnipeg, Man., Can.:—Because of our advertising, we cannot give the information you request. In connection with this, we suggest that you write to the CAA, Washington, D. C. They will gladly give you all the data you desire.

H. Alyn Seavey, Jr., Braintree, Mass.:—For information on your question, we suggest that you write to Office of Public Information, Royal Canadian Air Force, Ottawa, Canada.

Bern Ederr, Baltimore, Md.:—We cannot supply you with photographs that have appeared in FLYING ACES, since these must be kept for our office files. Perhaps some of the photo companies advertising with us have what you desire.

Robert Thoms, Philadelphia, Pa.: —Sorry, but to the best of our knowledge we have not presented solid plans of the Curtiss P-40. The April, 1939, issue, however, did carry plans for a flying scale of that ship.

Ronald Leroux, Montreal, Que., Can.:—You are definitely correct. That RAF "fighter" flown by Regis Toomey in "Dive-Bomber" was nothing more than a Ryan S-T with camouflage and a built-up radial cowling around the Menasco engine. American designation for the Harvard is BC-1, and BT-9 for the Yale.

Bill Reid, Wawanesa, Man., Can.: —You can contact J. B. Rust, author of our "Messerschmitt Fame—Fact or Fancy" article, at 219 W. Brown St., Cleburne, Tex. He will be in more of a position to have that material than we are.

Nicholis Marine, Gray, Pa.:—I'm sorry, but there's nothing that we can do to help you as far as the American Service Foundation is concerned. As we stated in our recent letter to you, they have certain qualifications to be met, and it seems that you do not have those particular qualifications. If this is true, you are not in a position to receive aid from them.

David Chase, Denver, Colo.:—We still insist that the Bell P-39 is the only American fighter mounting a 37mm. cannon. The Lockheed P-38 is fitted with cannon, true, but those weapons are said by reliable sources to be of the 23mm. Madsen variety. If any other information has come out on this we have not heard it. Your guess is as good as ours as to why the Lycoming flat is not used more extensively, but as an offhand guess we might say that the plant is probably not as yet developed to its full efficiency. That, of course, is not official. We have no word of the Napier Sabre being built in the United States.

Richard Ede, East Cleveland, Ohio:—Information on all those planes has appeared in F.A. within recent months. If you will tell us exactly what you would like to know, though—if you are unable to find the material you wish—we will be happy to comply.

Charles Wright, Cleveland, Ohio: —If you are only sixteen, you cannot obtain a license and will be unable to secure permission from either the State or Government to do so. You are allowed to fly, however, and can even solo. So you can go right ahead and build up your time, and when you are old enough you will have the required hours. From the looks of things at this writing, though, the war with Japan is practically putting a stop to all commercial flying. But it's quite possible that by the time you read this things will have been changed.

Jack Barnhill, Bristol, Va.:— Pictures for FLYING ACES are obtained from many different sources. We get them from the Army and Navy, from individual photographers, from aircraft companies, and from photo agencies. Those we purchase usually run quite high, and we do not believe that the average photo collector would be able to afford them for private collections.

Morry Nash, Montreal, Que., Can.: —As far as I know, it is now impossible to get plans or kits of full-size planes for home building. It is unlawful in the United States to build such craft, and when the law was passed many companies dealing with planes of that type closed shop. Why don't you check with your Canadian aviation magazines? The story up your way might possibly be different.

Robert C. Farrell, Jr., Jamaica, N.Y.:—Until a short time ago, it was necessary to be a college graduate, or have the equivalent knowledge, to become an Air Corps Flying Cadet. Now, however, that ruling has been changed and only a high school education is necessary. For further information, I suggest that you write to the Office of the Chief of the Army Air Forces, War Department, Washington, D.C.

Arthur Sutter, 5672 Keith Ave., Oakland, Calif.:—You say that you are a photo fiend and would like to trade pictures and negatives with other fellows interested in the hobby. Well, perhaps some of our shutterbug readers will contact you on this.

Eric Holt, Jr., South Wales, N. Y.: —About the most complete book we know of dealing with aircraft engines is *Aircraft Engines of the World.* It sells for $7.50 and may be purchased from Paul S. Wilkinson, 216 E. 45 St., New York City. *Aerosphere,* too, has an aircraft engine section. The price of this volume is $10, and it can be purchased from any book store.

Philip Pearl, Albany, N. Y.:— Sorry, but I have no record of the plane on which you seek information. There was such a ship, I know, but I have been unable to track it down. Photographs of first World War airplanes may be purchased from Airbooks, P. O. Box 958, New Rochelle, N. Y.

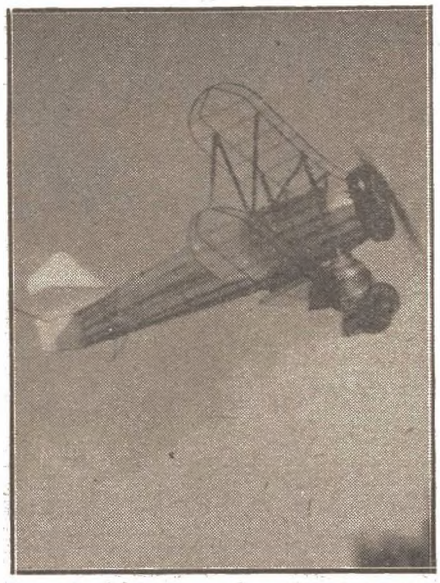
Arthur J. Dene, Cambridge, Mass.: —Certainly, you can subscribe to the British magazine *Aeronautics.* They note what the foreign subscription rates are, I'm quite sure.

R. Galland, Buffalo, N. Y.:—According to latest information, the Republic Air Forces P-47B is the Army's fastest and most heavily armed fighter. There are undoubtedly more advanced pursuits in the process of testing, but we have not as yet received information concerning them.

Roy L. Miller, Loudon, Tenn.:— For a better answer to your question, I suggest that you write to the CAA, Washington, D.C. Since we do not have the facilities to inspect thoroughly all types of gliders on the market we cannot answer this as well as the CAA.

THE END

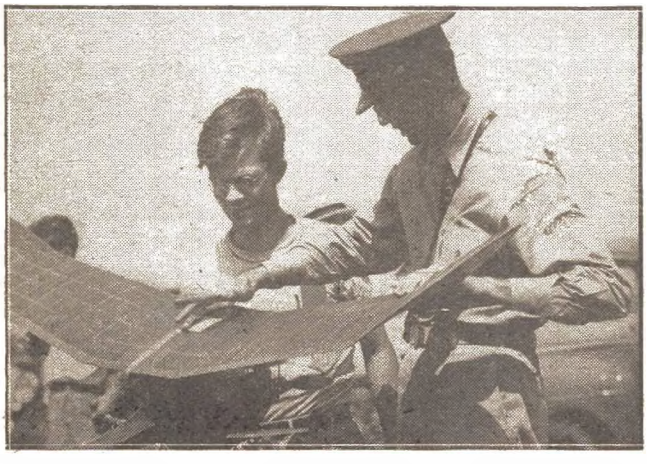
Berni Schoenfeld and his "Whirl-Away" gassy. His "Gooch" will soon appear in *Flying Aces.*



One of our readers sent us this photo of a Japanese Kawaski Fighter model. It flies well.

Like a fly caught in a giant web, this little gas job hangs until the rescuers retrieve it.

With the Model Builders



At the recent Stix, Baer and Fuller sponsored model meet in St. Louis, Erroll Painter and Pvt. Cliff Nance co-flew their entry.

Members of the "Aeromodelistas De Ponce" club in Ponce, Porto Rico, are an active organization. Many of them are F.A. Clubsters.

Here are some of the members who joined the model building class of the Bensonhurst (Bklyn.) Jr. High. They work after school hours.

When Billy Cook, screen juvenile isn't acting before the cameras, he'll be found down in his workshop turning out models like this one.

HISTORY OF AIRCRAFT INSIGNIA AND IDENTIFICATION MARKINGS

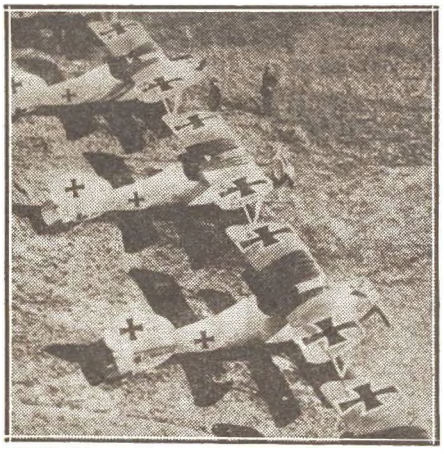
by Seton David, Jr.

AIRCRAFT SPOTTERS in the United States will not have to worry about identification markings of airplanes flying high and furiously fast toward their objectives. The silhouettes of these planes will be sufficiently familiar to the spotters to determine whether they are invaders or not.

Aircraft recognition is no easy task. The study of the individual airplane, beginning with broad principles and progressing to details, is based principally on silhouettes. Photographs and models are also used. While a silhouette will provide the detail of the plane, the picture can show the characteristic manner in which it "sits" in the air.

Perseverance is a prime quality for spotters if they would master the recognition of scores of different types of aircraft. In Britain, for example, to be one hundred percent efficient, aircraft spotters must recognize the silhouettes of about four hundred different types of planes including British, French, German, American, Russian, Dutch, Rumanian, Spanish, Greek and Turkish.

On the other hand, American aircraft spotters will not find it necessary to reach that superlative degree of efficiency as the possibility of invasion stems only from two aggressor nations—in the east and in the west. But then the possibility of such an invasion is quite remote.

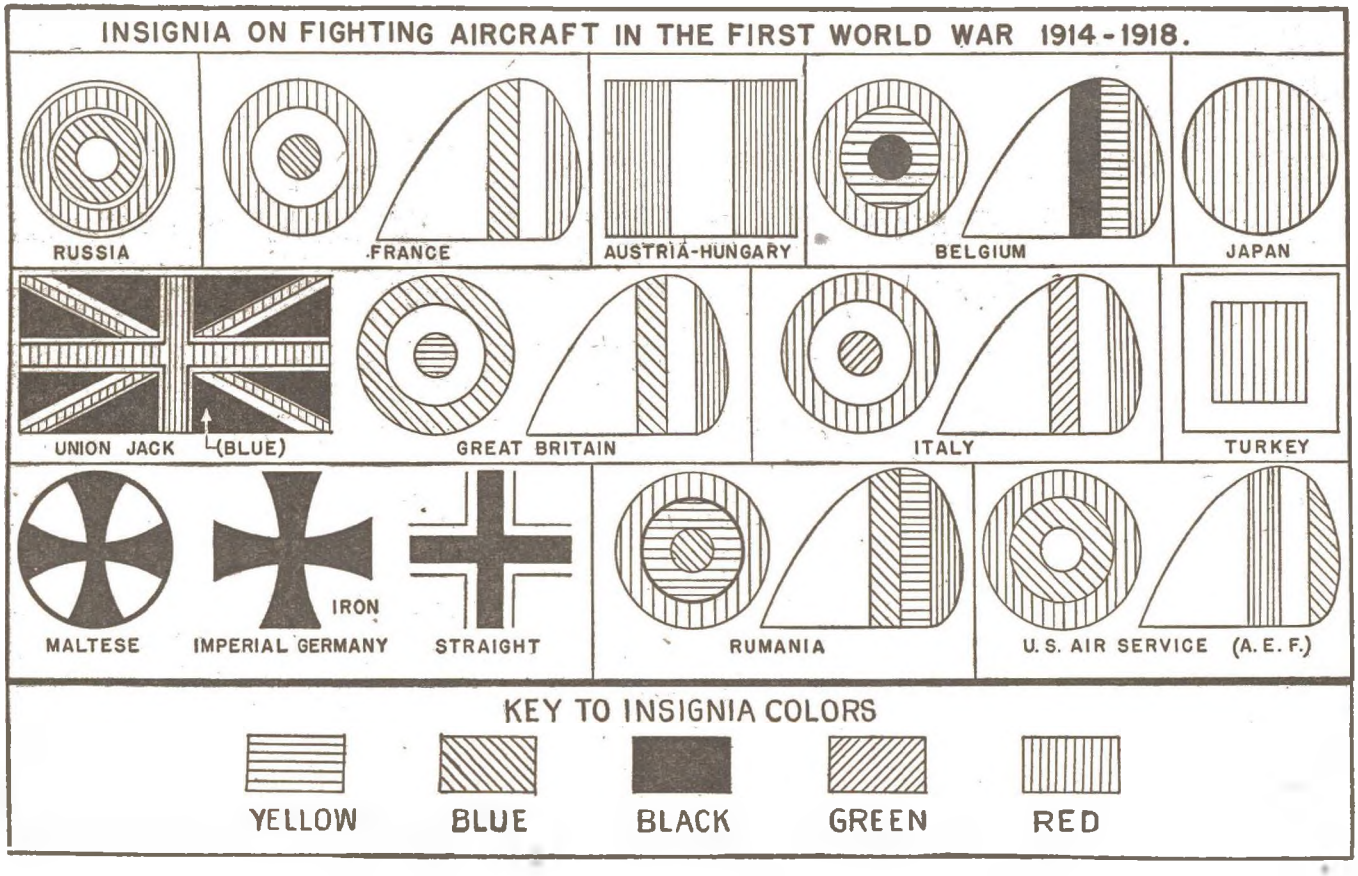


Albatross D-3's bearing insignia taken from the Iron Cross Medal created in Prussia in 1813 during the war against Napoleon I.

Recognition of aircraft was not so simple a matter in the early months of the first World War. Then aerial warfare was military science's newest contribution to martial tactics and confounded civilian and soldier alike in the early days.

The planes were then skeleton frameworks with bicycle wheels used primarily for patrol purposes. The airmen observed and took notes on the enemy positions and flew leisurely home. If, perchance, they met opposing pilots, they would exchange greetings by a wave of the arm as do motor cyclists on the highway today. This phase of warfare was still romantic and chivalry and gallantry flourished.

During this time, however, refinements in identifying the airplanes were made. Many of the belligerent planes were similar in appearance and it was necessary to mark them so that the ground troops could identify them to avoid firing on their own craft. And so there developed a minute phase of the war whose interesting history has long been buried in the archives of the warring nations.



A rare photograph of a Russian-built Nieuport fighter. There couldn't be any mistake about the machine's nationality as there were fourteen cocardes all over the plane.

NATIONAL FLAGS were first used for identification purposes, but soon discontinued when it was found that they would not serve to identify the nationality of the plane very effectively.

The usual location of insignia on the airplanes was as follows: On biplanes, the insignia was to be found near the tips on the upper surface of the upper wing and similarly on the underside of the lower wing. The insignia was also placed on both sides of the fuselage between the pilot's seat and the tail; and on both sides of the rudder. On monoplanes, the insignia placements were the same except that they were placed on the top and undersurfaces on the wing. On dirigibles and balloons the insignia was found on the sides, bottom and top of the gas envelope.

The system of insignia design during the early days of the World War was agreed upon by France, Britain and Belgium. The agreement called for the Allies to mark their aircraft with tricolored concentric circles and tri-colored vertical rudder stripes, the colors being drawn from their respective national ensigns. The Central Powers employed variations of the mystic symbol more than 10,000 years old, the Cross.

RUSSIA

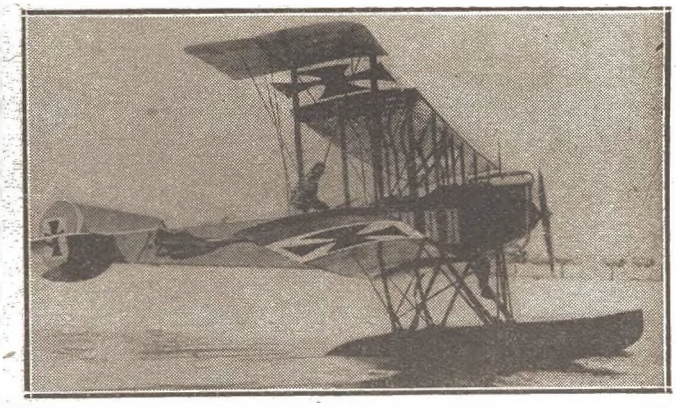
The concentric circle device, commonly known as cockade, from the French *cocarde*, was originated when the Russian airforce was established in 1910, by order of the Grand Duke Alexander Michailowich, then commanding the Russian air force.

Russia used the cockade during the World War. It consisted of a large white solid circle in the center, surrounded by concentric blue and red circles, red being the outermost. On some of the aircraft, the red and blue rings were encircled by narrow white circles, to make the cockade more outstanding.

The cockades were painted on both the upper and lower surfaces on the upper and lower wings, on top of the elevators, and on both sides of the fuselage and rudder.

The colors of the insignia were taken from the imperial flag of Russia which had three horizontal stripes, white on top, blue in the center and red at the bottom.

The first Russian Navy aircraft before the World War had the Navy insignia on the rudder only. It consisted of a rectangle with two blue stripes running diagonally in opposite directions across the whole rectangle. This was the flag of the Russian Navy. With the outbreak of the War in 1914, the Navy aircraft adopted the Army airforce insignia to eliminate any possibility of misunderstandings which were quite apt to occur in the feverish war period.



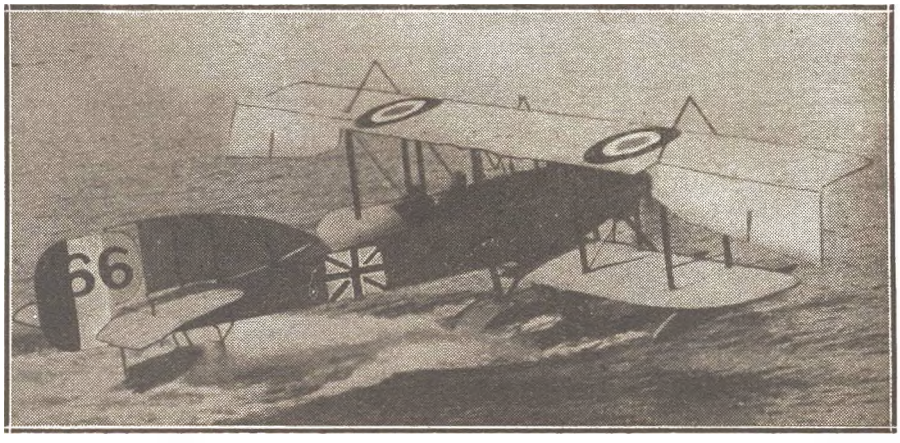
Seaplanes and flying boats of the Imperial German Navy carried pennant shaped streamers attached to the trailing edge of the lower wing. Note the streamer being blown back by wind.

Gen. "Billy" Mitchell, chief of the A.E.F. aero squadrons selected the tri-colored markings for U. S. Air Services. He approved on most squadron insignia.

FRANCE

The distinctive markings on French Military airplanes were adopted in December, 1918, and were the colors of the national flag. The insignia, of concentric design, was red, white and blue. The rudder markings were blue, white and red, with blue nearest the vertical fin. The concentric design appeared on the wings but not on the sides of the fuselage. French naval planes adopted the same insignia in 1913, adding a marine anchor on the white stripe on the rudder. The color of the anchor was blue.

A later model Short Bros. seaplane bearing both Union Jack and tri-color cocardes. Early models had only national ensign marking which was soon discarded because it resembled a German cross at a distance.



SERBIA AND MONTENEGRO

The Serbian Army did not have any aviation of its own but had a squadron of French airplanes attached to it. These ships were piloted by French aviators and carried the French insignia. The little Montenegrin Army never had any aviation in any shape or form.

GREECE

British airplanes were used by the Greek Army and Navy. The insignia, therefore, was that of the British and found in the usual positions.

BELGIUM

The Belgians identified their planes with cockades one or two months after the war began. The wing insignia consisted of concentric circles of red, yellow and black—the national colors of Belgium. The rudder markings were black, yellow and red. The Belgians did not use the tri-colored concentric insignia on the sides of the fuselage.

JAPAN

The insignia for Japanese aircraft during the War seems to have been conceived simultaneously by a number of Japanese Army officers, according to the Japanese War Office. This view seems reasonable since the *Hinomaru*, or red sun, which has for centuries been regarded as a symbol for Japan, appears on the Japanese national flag.

Exactly when, under what circumstances or by whom this insignia was placed originally on aircraft is unknown. The first regulation prescribing its use was issued in 1918, but the emblem had been adopted and was in general use before being officially prescribed.

The *Hinomaru* appeared on the upper and lower surfaces of the wings and in the middle of the fuselage on both sides. However, the rudder bore no distinctive marking of any sort.

GREAT BRITAIN

When the British Royal Flying Corps entered France in August, 1914, all its planes were unidentified except for an occasional manufacturer's name and serial number. Employed for observation purposes and patrol, these flights were dangerous, for the lack of national identification caused them to be fired at from friend or foe alike.

At the end of August, 1914, to correct this situation, the Union Jack was used as an identification mark for both naval and military planes. It was painted on the undersides of the lower wings and on both sides of the fuselage aft of the cockpit and on each side of the rudder.

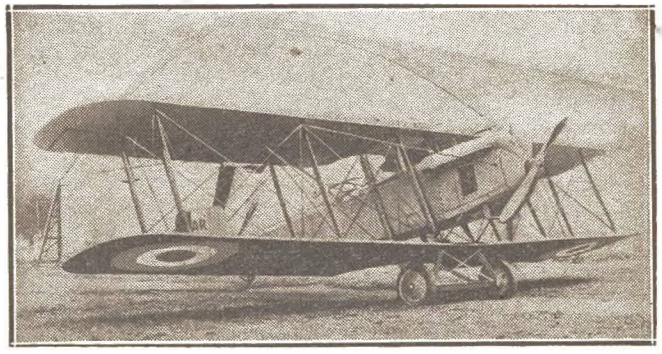
This, too, proved to be unsatisfactory for when the planes flew at high altitudes only the cross of St. George on the Union Jack was visible and hence often confused with the German cross which was somewhat similar in appearance.

For this reason the concentric circle insignia of the Royal Flying Corps was adopted for all British aircraft. As of a memorandum issued December, 11, 1941, by Headquarters, R.F.C. Military Wing, following went into effect.

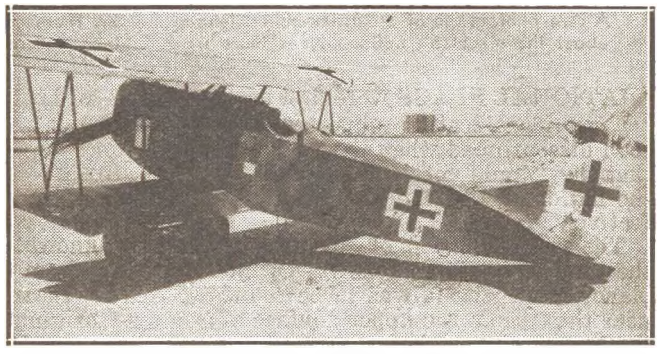
"All aeroplanes of the R.F.C. are to be marked on the underside of the wings and rudder with the concentric circles similar to those on French machines but with the colors reversed, that is, with red circle inside a blue ring, [naturally separated by a white circle]. The circles will be as large as possible. In addition, a Union Jack, 2 ft. by 1½ ft., will be painted on the wing-tips outside the circles."

Shortly afterward the Union Jack design was again eliminated and upon instructions issued May 16, 1915, vertical stripes of blue, white and red were ordered painted on the rudders of all British aircraft in place of the concentric circles previously specified. The blue stripe was placed nearest the vertical fin with red at the trailing edge.

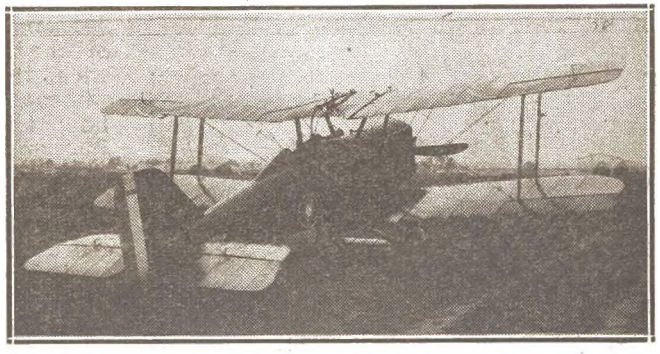
The addition of tri-colored cockades to the sides of the fuselages of British military aircraft was made under an order from the R.F.C. Headquarters on June 23, 1915. The object was to enable airmen to more easily distinguish friendly from enemy aircraft



A French two-seater reconnaissance job. The letters "A.R." on the rudder meant simply that it was "A Renault"-type military plane.

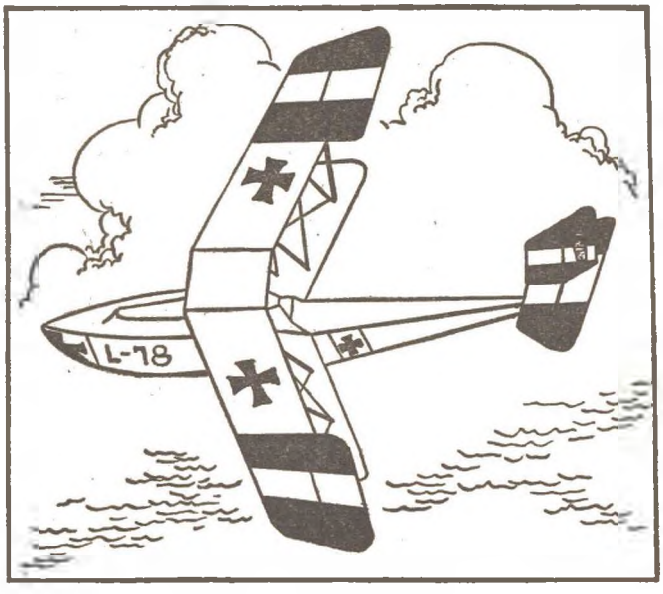


A Fokker D-7 bearing another variation of Cross markings in the latter part of the war. Fuselage type number reads Fok D VII.



An S.E.5 flown by pilots of the A.E.F. pursuit squadrons stationed in France. England, France, Russia, and U. S. all used various combination of red, white, and blue arranged in concentric circles.

An Austrian Ago flying boat bearing typical wartime identification tags. Wing tips and entire tail surfaces were striped in red, white, red, style.



at greater distances. To supplement the cockades on the undersides of the lower wing and fuselage a later order was issued to use cockades on the upper surface of the top wing. The markings thus described were borne throughout the war on all British naval and military aircraft.

ITALY

The Italian concentric circle insignia for military and naval airplanes was adopted in May, 1915. The persons believed to be responsible for its choice were the Hon. Chiesa and General Buongiovanni, both in charge of the Italian air Service at the time.

The colors of the cockade and rudder stripes were green, white, and red. These are the colors of the Italian flag. The cockades were placed on the wings and fuselage, similar to the British and French planes.

The crown and the escutcheon were introduced toward the end of 1915 and placed on the white stripe of the rudder markings. The additional use of the crown and escutcheon was not mandatory so that aircraft appeared throughout the war with or without them.

TURKEY

Turkish insignia on both military and naval aircraft were identical. Colors for the insignia were the national ones, namely red and white. The design, a red square with a white border, was placed on the wings and fuselage but not on the rudder.

GERMANY

Germany's airforce had three different insignias during the World War. In the order of use they were the *Maltese Cross*, the *Iron Cross* and the white-bordered, straight-lined cross.

The *Maltese Cross* was carried by the German airplanes only for a very short time. Further use of this insignia was discontinued, as the curved lines diminished the easy recognition of the insignia at great distances. Some planes bore this type of cross in a white circular field.

The *Iron Cross* was applied to all aircraft immediately at the mobilization of 1914 in order to make them recognizable as German airplanes. This insignia was in use until the middle of April, 1918. The *Iron Cross* had no historical significance.

The white-bordered, straight-lined black cross was prescribed by the Commanding General of the Air Forces on March 17, 1918, effective April 15, 1918. The only reason for this change of the insignia was for the improvement of the recognition qualities. Other reasons besides this one did not play any part.

During the War, the airplanes of the army and navy carried banners only when, for a specific reason, they were supposed to be made especially recognizable. Thus the planes of squadrons and echelon leaders, as well as the infantry planes, received such banners.

The mobilization orders of 1914, referring to the identification of the German military planes, contained the order: "Each airplane receives a black cross across the whole breadth of the surfaces on the upper and lower side of each wing, as well as on both sides of the rudder."

The order of the Commanding General of the Air Forces of March 17, 1918, prescribes expressly the attachment of the cross "at the two outer ends of the lower surface of the lower wing and at the two outer ends of the upper surfaces of the upper wing."

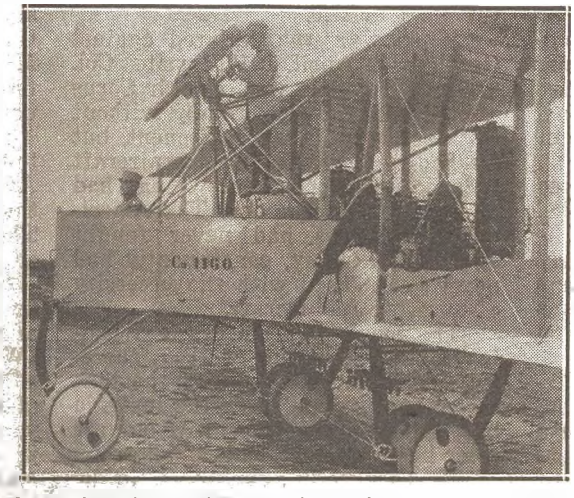
BULGARIA

At the outbreak of the Balkan War of 1912-1913, Bulgaria hastily organized an aviation corps whose pilots were chiefly French, Russian, Italian and British. After the war its aviation activities were neglected until the World War, when it was again revived and reorganized with Germany's assistance. All aircraft used by the Bulgarian air corps was of German and Austrian make and therefore carried the insignia of the German cross.

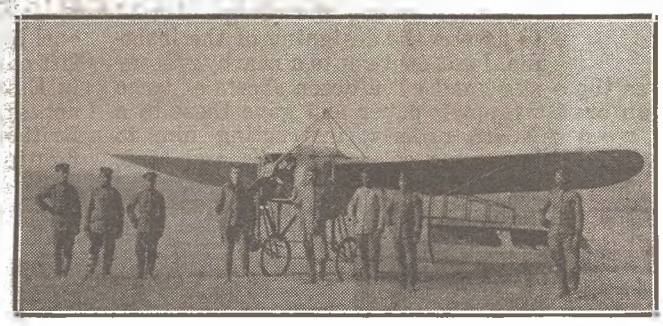
AUSTRIA-HUNGARY

Operations Order 441, dated August 9, 1914, ordered all airplanes of the Royal and Imperial Army of Austria-Hungary to carry red, white, and red stripes on the wing tips and rudders. In addition, each machine carried a red and white pennant, about one-half the length of the fuselage.

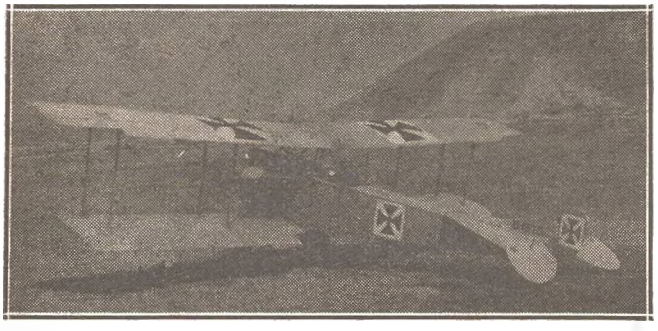
In the navy, the hydroplanes did not carry a red-white pennant because the propeller was in the rear. In accordance with Operations Order 1384, dated August 28, 1914, the hydroplanes were to be distinguished by the colors of the war flag on the rudder, while the whole tail bore the red, white and red stripes. Each section of the stabilizer including elevators were painted red and white, white being nearer the rudder so that the colors appeared to be red, white and red. The rudder included the coat of arms of the Royal Family, the major portion being on the white stripe and extending upward to the red one.



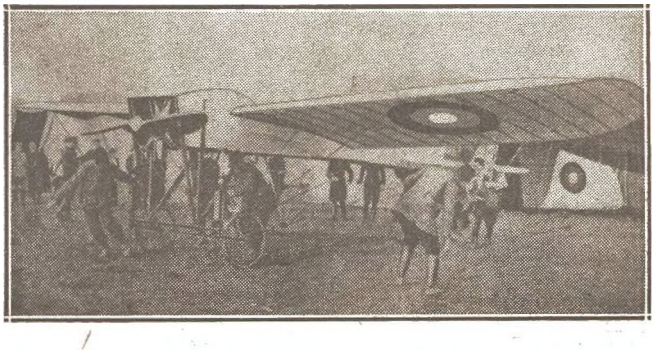
Simple serial number as shown on the fuselage of the machine in the above photo identified it as an Italian Caproni. Below: This Bleriot was used for observation work with the Bulgarian Air Force established in 1912. Insignia for military aircraft was used as early as 1913.



Bulgarian warplanes carried the Iron Cross marking superimposed against a large white square made markings visible at all angles.



At the outbreak of the Great War, Rumania pressed flimsy Bleriots and Nieuports into service. Insignia marked Nieuport wing in the back.



The hydroplanes carried at the prow a number or any one of the following letters: A. E. L. M. R. or S., to indicate the service in which they were engaged.

Flying the pennant soon proved to be impractical; besides the brilliant red and white striping made too good a target for the enemy planes. After the first year, the Austro-Hungarian air force adopted the black cross of the German Order of Knights which the German airforce used at the time. Thus the cross was adopted as the official insignia for both the German and Austro-Hungarian war planes, and was so confirmed by Operations Order No. 20,000/33 of the year 1916. Therefore, red-white-red insignia did not appear any longer on the military planes. The cross was placed in the usual wing positions, and on both sides of the fuselage and rudder.

Naval planes, however, retained the red-white markings and carried the Cross inward on the stripes. The letters and numbers on the prow were substituted by the black German cross on a white field. The Cross was also placed on both sides of the fuselage against a white background.

The color combination red-white-red has been used as a common emblem of the German Lands in Austria ever since the 13th century. The cross is a copy of the Germany Order of Knights who defended the German states against the heathens and Slavs in the middle ages. This insignia was carried on the shields of the knights.

RUMANIA

Before the War, Rumania was the only Balkan state possessing an organized flying corps. However, when she entered the conflict it was found that her equipment was seriously out of date. Despite this, obsolete Bleriots were pressed into service, being used mostly for reconnaissance work. Later British aircraft were supplied to the Rumanian army. The colors of insignia and rudder stripes are those of the Rumanian flag.

UNITED STATES

Col. Edgar S. Gorrell, writing in the February, 1933, issue of the U.S. Air Services Magazine, gives an interesting account of the origin of the U.S. Air Corps insignia. Through the courtesy of the U.S. Air Services, we take the liberty of reprinting Col. Gorrell's article.

"When war was declared against Germany in April, 1917," writes Col. Gorrell, "not only was our Air Corps of insignificant size, totally without satisfactory military equipment, but we had no insignia for our aircraft because up to that time we had had no use or need for one. The American Air Corps had never fought against an enemy, consequently had never been faced with the necessity of marking its aircraft.

"The handful of officers in Washington in the spring of 1917, therefore, were confronted with the task of originating not alone the insignia but the entire equipment of our air force in the conflict. This small group of officers were in a few rooms in the Mills Building, across the street from the War Department Building in Washington, D. C. At one time 'Tommy' Milling and I occupied an office together. Among the things allotted to us was the designing of the insignia. I was sent out to a nearby grocery store and got a dozen sheets of large wrapping paper and gave these to a Negro orderly, instructing him to buy some colored pencils and some children's water colors from a nearby store that sold school supplies.

"Hastily I scratched on each of three scraps of paper, three sets of concentric circles and marked them to indicate various combinations of the colors red, white and blue. I then drew on three other sheets of scrap paper five-point stars inside of other concentric circles, with a concentric circle inside of each star and indicated different combinations of red, white and blue. The Negro orderly took the rough suggestions on the scratch papers and drew to scale on the sheets of wrapping paper, cut to about three feet square, the various six combinations I had in mind. We then pinned these around the wall. Milling and I discussed them and finally decided on the one which is used today.

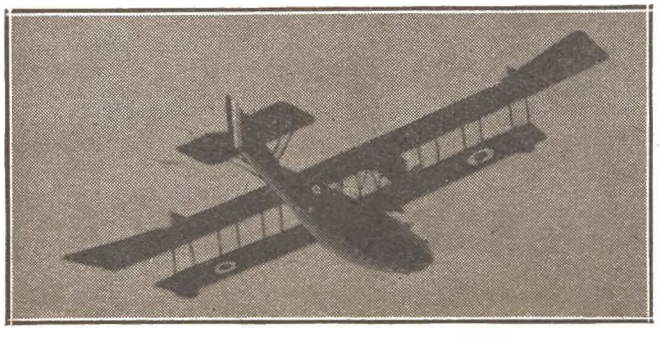
"We passed the different selections to the other air officers on duty in the Aviation Section, Signal Corps, and they agreed with us in our selection. The one in use today was thus adopted in the spring of 1917.

"When we landed in Europe, the first discussion of the new insignia arose in the summer of 1917. Colonel [William] Mitchell had been appointed by General Pershing in command of the Air Service, Zone of the Advance A.E.F. Mitchell objected to the insignia chosen in the United States mainly on the ground that he had never been consulted. He desired to use three concentric circles similar to those being utilized by the British and French, but with a different combination of red, white and blue. Colonel Mitchell's objections would have left our insignia for use in our Army in Europe during the war similar in appearance to that of the French and British, alongside of whom we were fighting, and would thus designate

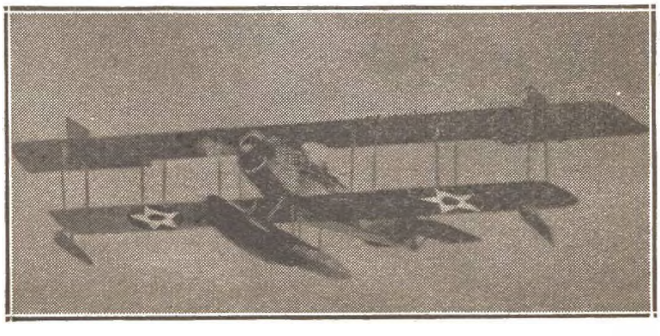
An all-metal Junkers bearing the Cross used toward the end of the last war. Today, in addition to the swastika, it identifies Nazi planes.

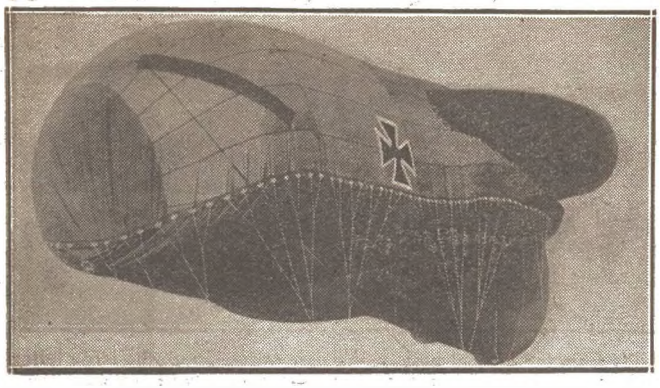
An early Nieuport fighter. These sesqui-planes carried tri-color cocardes on the underside of the top wings. "N" on rudder stands for Nieuport.

A U. S. Curtiss-built flying boat which cooperated with the British sea forces on patrol work. British markings on wings. U. S. colors on rudder.

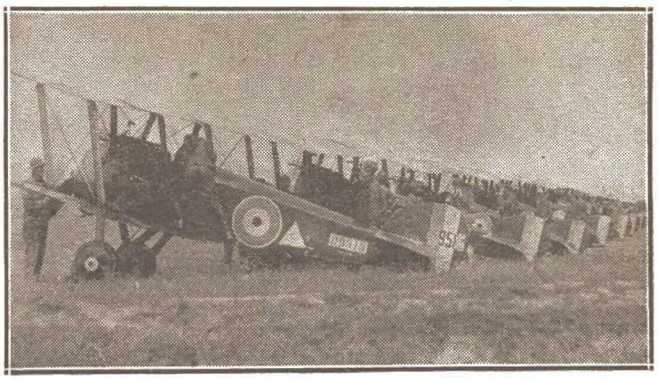


Curtiss JN4-D2 Navy trainers used in U. S. during the war carried the "star-in-the-circle" insignia. This was never used on U. S. planes abroad.

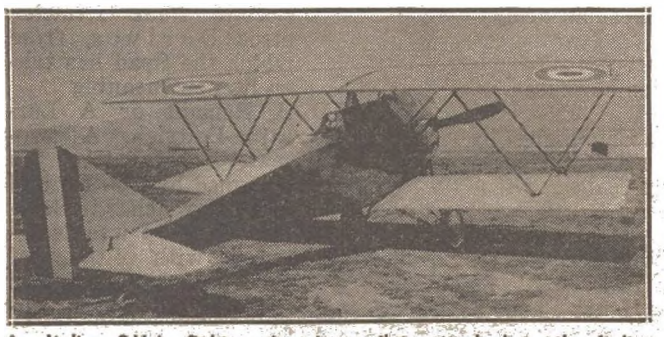




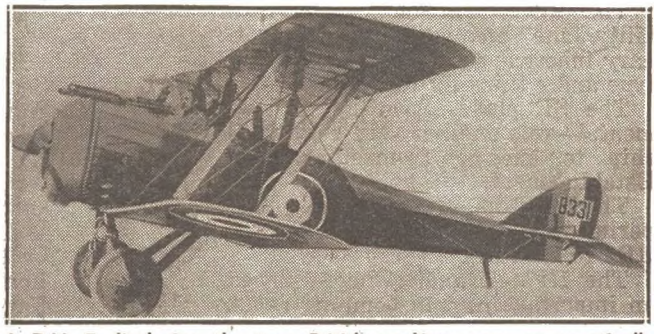
German observation balloons always carried the Iron Cross emblem outlined in white. "Balloon busters" made a good target of it.



Sopwith Camels of the 148th U. S. Aero Squadron carried regular British insignia. Sometimes the tri-colored markings were encircled in white.



An Italian S.V.A. fighter. American pilots attached to the Italian Air Force flew these ships bearing the red, white, and green insignia.



A D.H. 5 displaying the type British markings seen on practically all fighting craft during the latter months of the first World War.

an allied airplane. Also, it would have left the allied planes on the Western Front all with three concentric circles but with different combinations of red, white and blue, while the Germans were being designed by a cross. Since the British, French and American planes would be marked with concentric red, white and blue circles and the German planes with crosses, and since there could arise no confusion as to which plane was allied and which enemy, we raised no objection against Mitchell's argument against the insignia adopted in the United States, even though opinion was not unanimous in Europe as to which insignia really and truly was the best. For the moment, it was a point of no great importance.

"The war being over and our troops being once more upon American soil, the Air Corps, on all its aircraft, has continued the use of the insignia worked out in accordance with the circumstances hereinbefore described."

American patrol planes operating over European waters bore the tri-colored insignia similar to the British, but used the red, white and blue stripes on the rudder, with red at the rudder post.

The rudder arrangement was in use from May 19, 1917, to February 8, 1918, and then were changed on February 8, 1918, to blue, white and red.

Identification Markings

ANOTHER SYSTEM of identification markings, more prosaic, but used to clinch the grim honors of aerial warfare by the victorious flyers in their official reports, was the markings usually found on the sides of the fuselage near the tail assembly or on the vertical fin and rudder.

These markings were usually the manufacturer's name, model or serial number, the year of make, and sometimes a letter designating the plane's purpose.

Following is a list of World War planes as adopted for identification purposes. The Germans in most cases used Roman numerals for numbers.

THE Germans used the letter C for pursuit planes, D for single seater fighters, and G for the bombing types. Take, for example, a German plane bearing the identification marks: "FOK D-VII '17." It signifies as follows: FOK, Fokker airplane; D, single seater fighter; VII, the model number, and '17, the year of its manufacture.

The French used a different system for identifying its types and divided them into three groups. Planes bearing the letter A, which signified Artillerie, were used as observation ships; B for Bombardment; and BN or Bn for Bombardment de Nuit which, translated freely, means night bombing, light and heavy, respectively. C stood for Chasse, a designation for pursuit planes.

Thus, a newly manufactured French plane would bear the following markings: SPAD XIII C-1 (or, as some Spads were marked, *S*-XIII C-1), Spad taking its name from the company under Bleriot's direction; XIII, type 13; C-1 meaning Chasse or pursuit plane, 1 seater. There were, of course, several types of Spads.

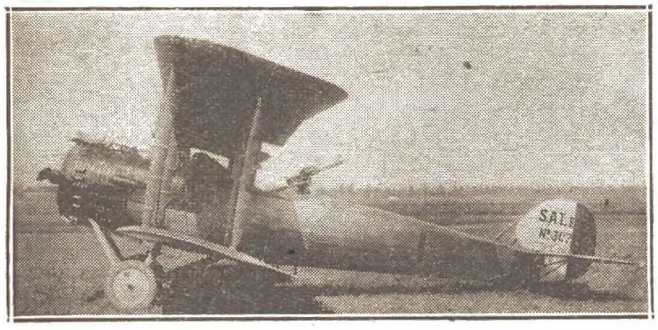
In the early part of the War, Italy had no adequate aircraft for its own needs, and it was therefore necessary for her to rely upon her Allies for equipment until Italian production fulfilled her demand. Designs for the Farman, Caudron, Hanriot, Deperdussin, Voisin, Nieuport, Bleriot and also Bristol monoplanes were imported for the Italians to build.

The British planes produced by the Royal Aircraft Factory at Farnsborough were of numerous designs and designations. The Royal Aircraft Factory was so known until April 1, 1918, when the name was changed to the Royal Aircraft Establishment to avoid confusion with the initials of the Royal Air Force which had previously been known as the Royal Flying Corps.

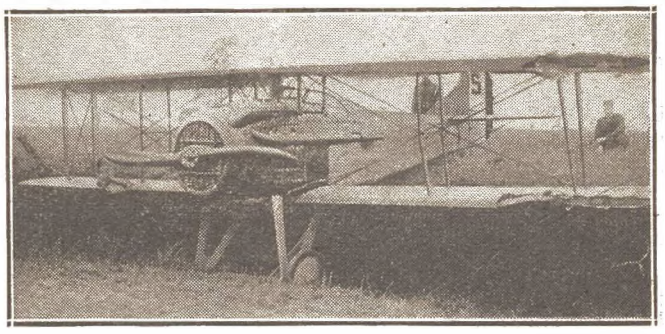
The Establishment did not manufacture planes in quantity. It constructed only experimental types of various designs and, if proven successful, building contracts were awarded to airplane companies.

Among the successful machines to emerge from the Royal Aircraft Establishment were the RE's, FE's and SE's. BE at first indicated Bleriot Experimental, Bleriot receiving credit for having originated the tractor type airplane. Later, an original type BE was designed and built under the supervision of Captain Geoffrey DeHavilland of the RFC and it then took on the meaning of British Experimental.

The BE's, all of the same general design, were classified according to the various engines they were powered with, and their purpose. Thus there were the BE2, BE2b, BE2d and BE2e. The last two types were built in great quantities and were used extensively for training purposes. The BE's, which were developed up to BE12, were successful



Another famous French observation machine was this two-place job, identified by the markings as being made and powered by Salmson.



Aside from the unusual pose of this unfortunate Spad, the large letter "S" was used to identify this ship as a French-built Spad chasser.

in destroying many Zeppelins.

The BE2c was nicknamed "Stability Jane" because of its extraordinary inherent stability. 2 means 2nd type and c third modification.

The SE plane—Scouting Experimental—was another very successful ship to emerge from the Royal Establishment.

The RE ship—Reconnaissance Experimental—was developed from the RE2 to RE8 etc.

The HP's—Handley-Page—played an important part in bombing raids. This firm was established in 1908.

The FE's indicated Farman Experimental, credit being given to Henri Farman for having originated this type of machine.

Despite the use of the term "experimental" many thousands of planes were built. DeHavilland machines bore the initials D.H. and a model number following. The most famous of the wartime group being the DH-4 powered by the American Liberty engine.

GERMAN

A.E.G.	Allgemeine Elektricitäts Gesellschaft
L.V.G	Luft Verkehrs Gesellschaft
L.F.G.	Luft Fahrzeug Gesellschaft (Manufactured the Roland)
AGO	Aerowerke Gustave Otto
FOK	Fokker
ALB	Albatros
D.F.W.	Deutsche Flugzeu Werke
L.P.	Luftschiff Parseval
L.Z	Luftschiff Zeppelin
L.S.	Luftschiff Scutte-Lanz (Three types of airships used by German army)

FRENCH

SAL	Société des Moteurs Salmson
N	Nieuport. Established by Edouard de Nieport; commonly called Nieuport
V	Voisin. Manufactured by the Voisin Brothers. Founded in 1905.
F	Farman. Henri Farman began to manufacture his planes in 1908. His brother Maurice followed suit a little later. They merged in 1912
F.B.A	Franco - British Aviation Company; manufactured the F.B.A. flying boats
BRE	Breguet. Founded by Louis Breguet, who was one of the first designers to produce a satisfactory tractor biplane
BL	Bleriot. Louis Bleriot, who flew over the English Channel in 1909
CAU	Caudron
MS	Morane-Saulnier
SPAD or S	1. Societé Pour les Apparrels Deperdussin. The plane took its name from the initials of the company which built it 2. After the outbreak of the War in 1914, Bleriot took over control of the Deperdussin organization and changed the name of the company to Societé Pour Aviation etses Derives, from which the Spad has taken its new meaning
AR & ALD	A Renault or A Lorraine-Deitrich. A two-seater observation job designed by Col. Dorand of the French Air Service. The ship was designated with either of these letters according to the type of aircraft engine intended for use when the design was approved.

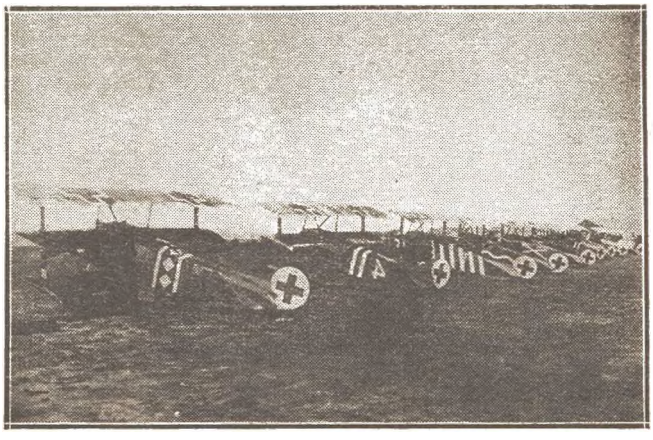
ITALIAN

C or Ca	Caproni
P	Pomilio
S.V.A.	Spa, Verduzio, Ansoldo
S.I.A	Societa Italiana Aeroplani (See Fiat)
F.I.A.T.	Fabrica Italiano Automobilia Torina. This was an airplane motor. The word Fiat in pure Latin, says Jane's *All the World's Aircraft*, means "Let it be" or "So be it." Freely translated it indicates that the Fiat is unmistakably "It." In Italian the word Sia also means "Let it be so," which is connotative to the word Fiat. It was a rather clever play on words
S.A.M.L.	Societa Anonima Meccanica Lambarda Monza.

THE END

Name, year of manufacture, and serial number information were marked on the tail of this Pfalz. All German craft were similarly identified. The markings on this particular ship read: Pfal D VIII 124/18.

Note the curious designs painted in this squadron of Fokker Tripes. Certain Jagdstaffels sported these colors so the enemy would get to know them more readily. It was all a part of aircraft identification.



Charles Hampson Grant

CHARLES H. GRANT'S NEW BOOK

A REVIEW OF MODEL AIRPLANE DESIGN AND THEORY OF FLIGHT

by Jesse Davidson

The author received his training at Princeton Engineering School and Massachusetts Institute of Technology which led to designing U. S. army ships in World War I. His glider experiments and work with large planes as early as 1911 earned a coveted membership in the "Early Birds." For 20 years he has been the world's foremost model flying authority, and for the past ten years has been Editor of MODEL AIRPLANE NEWS*—all of which is reflected in this, his life's work.*

KNOWING CHARLES HAMPSON GRANT as I do, I am sure he will forgive me when I say that my *only* disappointment is that his book *Model Airplane Design and Theory of Flight* comes to me fifteen years too late!

How well do I recall to mind of my more youthful days when I would build model planes with curious abandon and then watch with anxiety when they were launched. Will it fly? Why doesn't it climb faster? Have I enough power? Why is it so unstable? Oh, it stalls too much! Why does it spiral down so fast?

How much time, toil, and youthful fears could have been avoided had I had the advantage of the wonderful data, the knowledge, the benefit of C.G.'s successful experiments, his book is now able to offer.

But—better late than never.

Charles Grant's book (C.G. as he is affectionately known to all) is the result of more than two score years of intensive work in which time he passionately pursued with unwavering devotion and energy, an endeavor to establish a sound basis for a theory and acceptance of fundamental principles of model plane design and flight.

C.G. designed, built, and flew hundreds of original rubber and gas powered craft from which he accumulated data and was able to record these findings. And by employing mathematical relationships between factors of flight and the application of certain principles he proved his theories to the point where they are today accepted as standard by model aeronauts the world over.

For the rising as well as the present generation of model plane designers and builders, the principles and methods devised by Mr. Grant will be readily accepted, I am certain. C.G. has long recognized the need of such a volume and in offering it he has given to this fortunate generation of youthful air enthusiasts the most complete and comprehensive collection of material on this subject as is humanly possible.

Throughout its 516 pages, beautifully illustrated with photographs, charts, graphs, and diagrams is a veritable gold mine of material—all of it authentically and logically presented from the first steps in making a simple rubber powered craft to the fascinating gasoline powered plane. Every model builder should not only read this book, but make an all out effort to secure one—and own it!

While the air above us is turbulent with the roar of aerial duellists and crashing bombs, it is comforting to know that a man of Charles H. Grant's experience and background is available to all aero modelists just at a time when our youth is being sensitized to the growing importance of air power—for our future welfare and our American way of life rests in the hands of air minded youth.

Mr. Grant handled a difficult job well. I say difficult because he has also shown how one can relate the activity of the field of model aviation to the field which immediately surrounds it—full scale aeronautics. For not only does the hobbyist prepare himself to obtain the utmost pleasure from his craftsmanship, but at the same time arms himself with a thorough knowledge of the fundamental concepts of aeronautical science—which in 99 out of 100 cases is the field of endeavor to which the model builder will turn.

Model Airplane Design and Theory of Flight provides the reader with a thorough grounding in model plane fundamentals. Throughout the book his approach to each new subject is that of an experienced educator. By numerous graphs, charts, formulas, Mr. Grant presents a simple way in which the reader can understand the intricate problems associated with model design and which formerly could be solved by an aero engineer.

The book is divided into six major Parts:

1. The essential factors of flight, and basic information concerning lifting surfaces.
2. Stability. What it is—how to obtain it—and the theory involved.
3. How to proportion propellers; and the relationship of factors involved.
4. Comprehensive data on power delivered by rubber motors of all types and sizes; also gas engine operation explained.
5. Procedure in designing all types of models: Stick, Fuselage, Speed, Distance, Duration, and Gas.
6. Control. How to check for adjustments and balance—before and after test flights.

At the end of each Part there is a complete summary.

SO IF YOU WANT to know how big your original design craft ought to be and how much power it should have, or how to determine propeller pitch and blade area, or how you can obtain greater stability and flying efficiency, or how to calculate lift, area, performance, climb, glide, and find the answer to a host of other complex questions, this book will show you all the whys and hows—and dispel the idea that you have to be a genius to make a successful model.

I wish I could say more about this extraordinary volume and noteworthy addition to the annals of model aeronautics, but I think I can best summarize what else there is to say by repeating a comment once made by a Texas cowboy, who, after sitting up all night reading a book beside a campfire said:

"That feller has writ a piece; he seen a heap and told it true."

Yes, and how true! For *Model Airplane Design and Theory of Flight* is not only a book on model planes, it is the autobiography of Charles Hampson Grant.

Model Airplane Design and Theory of Flight may be purchased for $3.75. (Outside U. S., $4.50). Published by the Jay Publishing Company, 551 5th Avenue, New York, N. Y. THE END

News of the Modelers

All model clubs are urged to send us reports of activities for inclusion in this department—advance dope on contests, club activities, and results of meets. Such news should be sent to us as promptly as possible.

Aviation: Industrial Art

Under the leadership of Roy G. Fales of the State Education Department, a group of industrial arts supervisors and teachers are planning the promotion of junior aviation clubs in connection with the teaching of industrial arts and shop work throughout New York State.

Several meetings have been held with members of the Air Youth staff to discuss plans and a cooperating committee is to be appointed who will represent several sections of the state in the development of the program.

Consideration will be given to developing special project material which can be used in connection with workshop facilities. Further meetings to discuss the program are being planned.

National Defense Roll Call

As one of its most important actions to date, the AMA has moved to register every model airplane club in the United States for purposes of National Defense.

It is apparent that the time has come for all aeromodeling organizations to lend their support to the Academy's "an-aeromodeling-America" program, developed at the AMA's Pittsburgh Forum. Toward this end, registration of model clubs has already begun, and initial returns indicate that all are anxious to cooperate.

In announcing the Roll Call, Academy officials said, "In these times of National Defense it is imperative that every active model airplane club keep itself informed as to how its members can aid national defense. In many ways model airplane builders are already serving their nation, and it is expected in the more critical times ahead even greater importance will be placed on model aviation and its organized groups throughout the country.

"So that your model airplane club can keep informed on positions open to model airplane builders, developments in Civil Air Defense, latest regulations as applying to model aircraft flying, as well as news of contests and national prizes, should be registered now by the officers with the Academy of Model Aeronautics."

The official registration form asks for pertinent information concerning the model club, its work, and its leaders. An important question is the one which asks if all the club's members are American citizens.

To do the proper job, all model leaders must lend their support in registering each model plane group in their community and vicinity. An application should be filed by every model airplane club in America, *regardless of whether or not it has been or is now affiliated with the Academy*, or the former Junior NAA, or any other national, regional, or local organization. To preserve model aviation in the emergency and secure the proper recognition for aeromodeling, *it is imperative that every group register now.* Registration forms may be secured from and should be sent to National Defense Roll Call, Academy of Model Aeronautics, Willard Hotel, Washington, D.C.

What Are Model Airplane Builders Doing For Defense?

To insure the continuance of aeromodeling and its recognition as an essential defense activity, it is important that all model airplane builders and flyers who have gone on to positions in the air forces, the aviation industry, or allied defense work, register with Washington using this form, or a copy. This will help us prove the immediate defense value of model building.

Name ..... Age .....

City ..... State .....

Years of model building experience? .....

Are you now an active model builder? .....

Present occupation? .....

By whom employed? .....

Nature of duties? .....

How has your model airplane building experience helped you get and hold your present job? .....

.....

.....

.....

.....

Mail to Academy of Model Aeronautics, Willard Hotel, Washington, D. C.

AMA Club at Aircraft Plant

The first record of a model airplane club being formed among employes of an aircraft plant was established recently when the Academy of Model Aeronautics chartered the Curtiss-Wright Model Airplane Club of Columbus, Ohio, with a membership of 41 company employees, all holding Academy membership. The Curtiss-Wright group has held a successful invitation model airplane meet at Price Field.

Verlin F. Haines, an instructor at the Curtiss-Wright plant, organized the chapter. Raymond R. Watkins is president and Robert Hale is secretary.

Other chapters chartered by the Academy recently include the Galion, Ohio, Prop Busters, whose leader is Stuart Davies, and the Sidney, N.Y., Central School Model Airplane Club which is affiliated with the AMA under the leadership of Stanley S. Zamory, teacher.

Other chapters recognized are the Cincinnati, Ohio, Albatross Birdmen; the Bakersfield, Calif., Gas Model Airplane Association; the Lombard, Illinois, Model Manglers; and the Fresno, Calif., Gas Model Association.

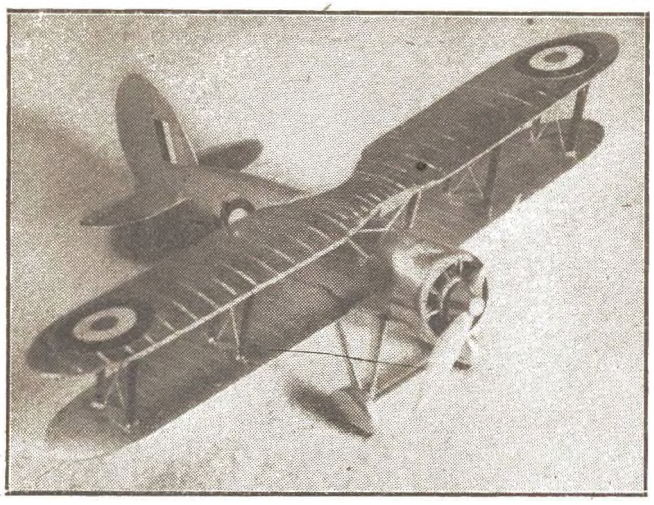
More charter applications are on file and will come up for action soon.

Philadelphia School Program

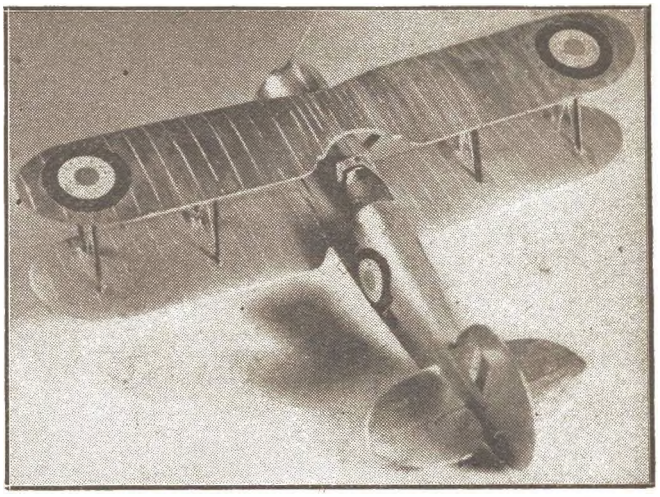
Philadelphia public schools have launched a model airplane building program that will include the formation of model airplane clubs in all of the junior and senior high schools, and also aim to make use of the interest in aviation with regular school subjects.

Dr. Alexander J. Stoddard, Superintendent of Schools, in announcing the inauguration of the program, said:

(Continued on page 71)



In spite of its design being a decade old, it still retains snap.



Nice lines and generous details make it a neat solid project.

GLOSTER GAUNTLET SOLID SCALE

by Harry Appel

GLOSTER GAUNTLET fighting machines made a brief but effective appearance in the British offensive in North Africa. These ships, rather old-fashioned as fighting plane types go these days, happened to be in that theatre of war when the Italian campaign got under way, and up they went to meet the invaders. Against superior designs and harder hitting planes of the Italian Air Force, these ships performed their arduous task remarkably well—and the Gauntlet first came out in 1933!

Steel tubing forms the skeleton framework of the fuselage. Light metal hoops attached to the fuselage gives a well streamlined oval appearance. The forward part of the body as far back as the cockpit has a metal covering. The aft section is covered with fabric. Tail surface construction is conventional with adjustable stabilizer and balanced rudder. The ship is powered by a Bristol Mercury engine of 640 h.p. which gives it a maximum speed of 230 m.p.h. at 15,000 feet. It cruises around 200 and lands at 59 m.p.h. Armament includes twin synchronized machine guns which fire through the propeller arc and which are mounted on each side of the fuselage in troughs. These are Vickers guns and carry a supply of 1,200 rounds of ammunition. Absolute ceiling is 33,500 feet.

Fuselage, Motor, and Landing Gear Details

FROM THE FULL SIZE plans on the double page spread the modeler can make up a material list from which he can obtain the correct sizes of blocks and pieces to begin carving. Start with the body first by tracing its outlines onto stiff paper templates. Make a side and top view. At the same time make templates for the rudder, elevator, and wing panels.

Balsa wood for the entire model should be of medium variety and free of knots. By referring to the cross-section views of the fuselage and placing the stiff paper cross-section templates against the sides of the body as you whittle it to shape, you will be able to obtain the oval section

ZOOM!

as required. Dig the cockpit out to one half the depth of the body itself at that point. Clean out with sandpaper and install a seat, miniature control, rudder pedals, and instrument board. Build a nine cylinder engine around the nose as shown.

The cowling may be carved from wood or a metal one purchased in the model shop. Sizes as shown on the plans are usually kept in stock. The propeller and spinner cap are carved to the required size and shape. Since the propeller on the actual ship is wood, it will be more realistic to stain the propeller and go over it with a clear coat of dope for a glossy surface. The machine gun troughs may be gouged out or painted black to simulate the same effect. The cowling is fastened to the top of the cylinders with dabs of cement on each head. A tail skid is shaped from bamboo.

The landing gear legs should be whittled to shape from hand white pine or bamboo. The wheel pants are optional and may be left off if desired. Study all three views when attaching the landing gear struts and make sure that sufficient lengths are inserted into the fuselage to provide a sturdy mount. Wheels are made of hard wood.

Wings and Assembly Details

ON PLATE 3 plans for the upper and lower wing panels are given. By wrapping medium sandpaper around a block of wood you can work the wing pieces down to the required camber effect as shown by sections EE, FF and GG. For views of the center section panel see the front plan and the top view on Plates 3 and 1 respectively. This section is made separately and when completed should be mounted into position with streamlined bamboo struts well inserted into the body and wings and cemented securely.

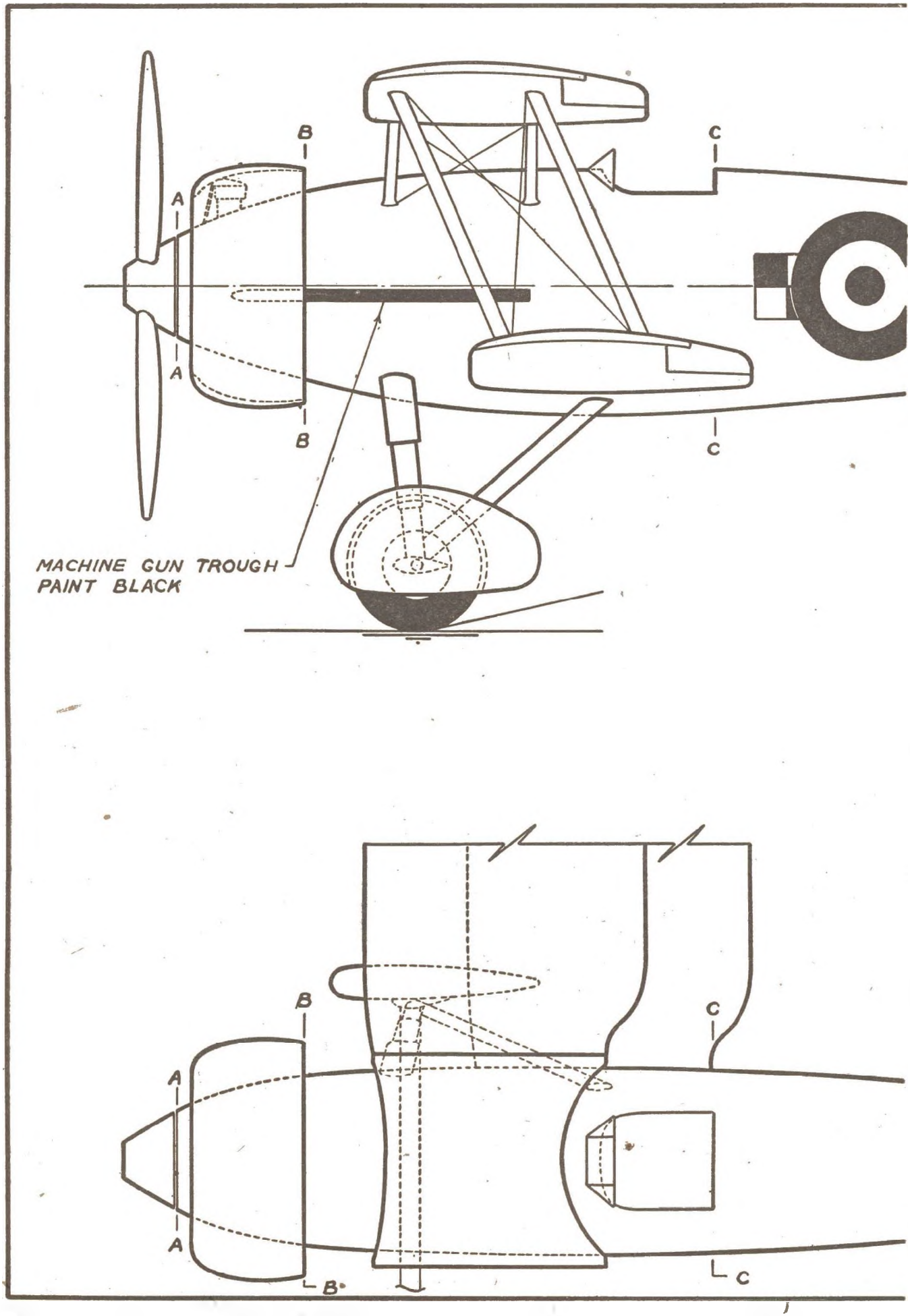
Shape the tail parts as shown by their streamlined views. These, too, are made from medium balsa. The elevator is made in halves and the rudder in one piece. Dark pencil lines in their respective places will indicate the hinge lines.

In attaching the wings, place the lower wing panels into position first. Use the cement generously and insert small model making pins to aid in holding the wings at the required dihedral angle until they are thoroughly dry. Next, attach the upper wing panels to the center section at the correct dihedral angle.

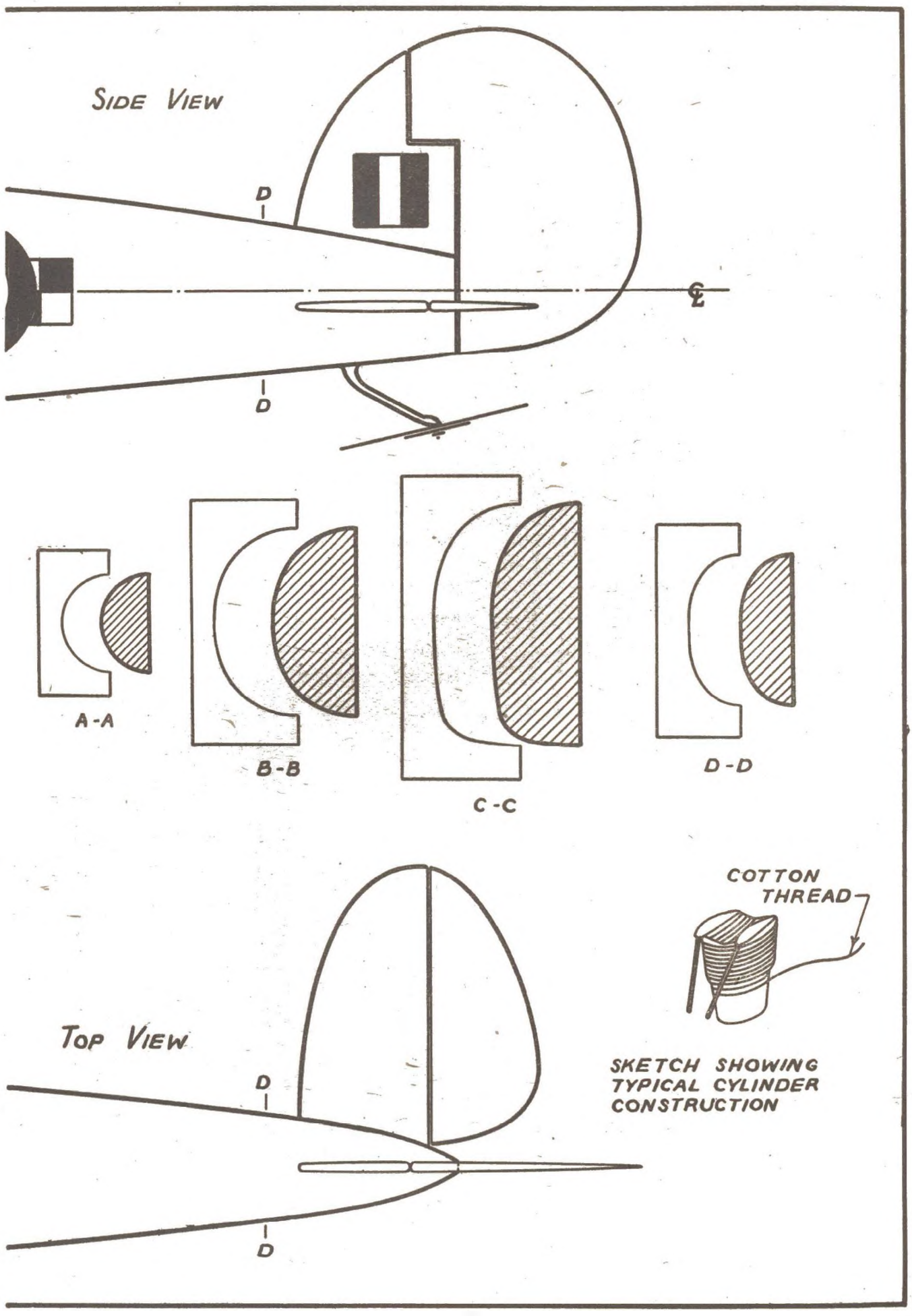
The double set of wing struts are made of streamlined bamboo pieces which are pointed at both ends so that

(Continued on page 70)

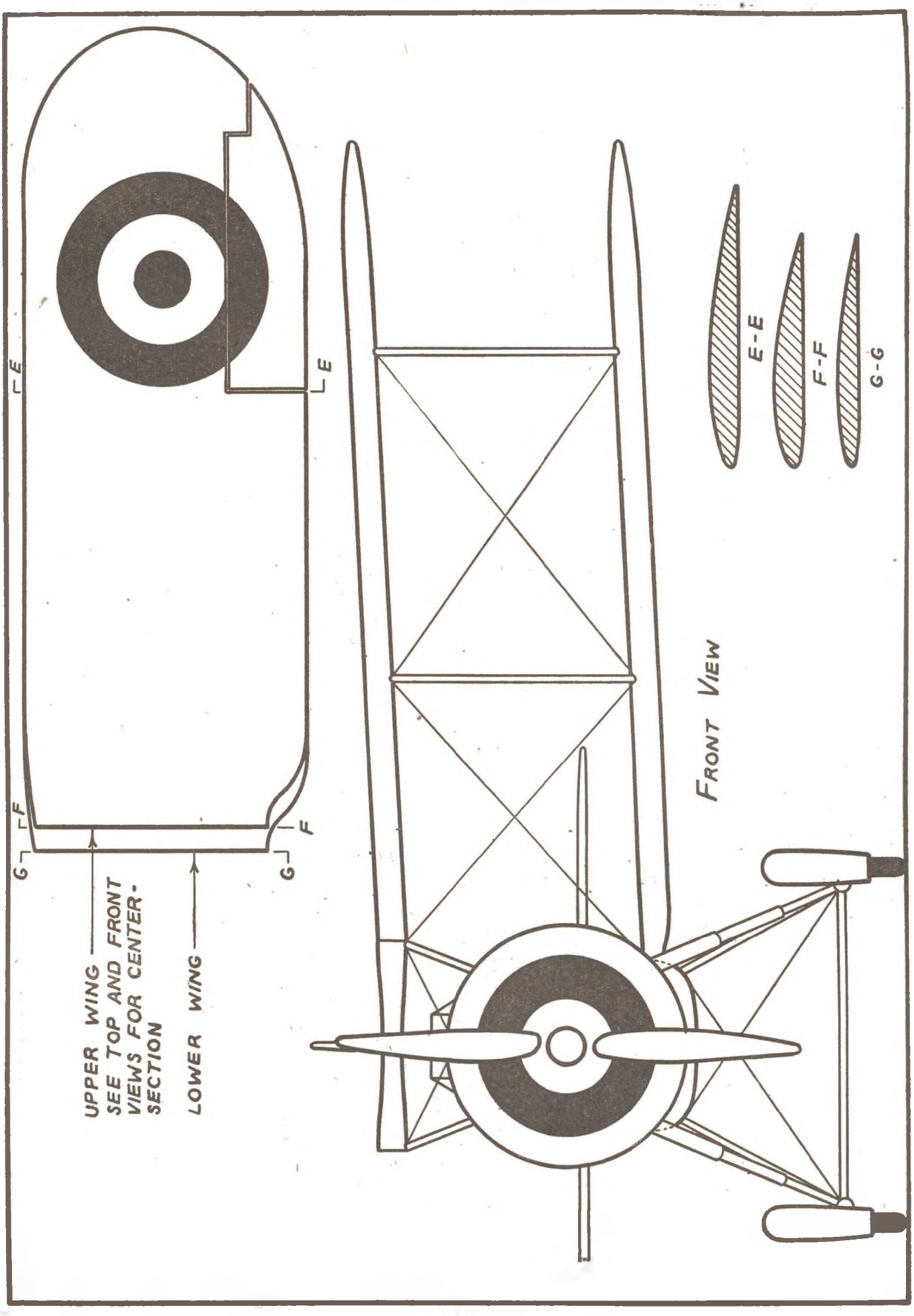
CARVE A GLOSTER BIPLANE FIGHTER—Plate 1

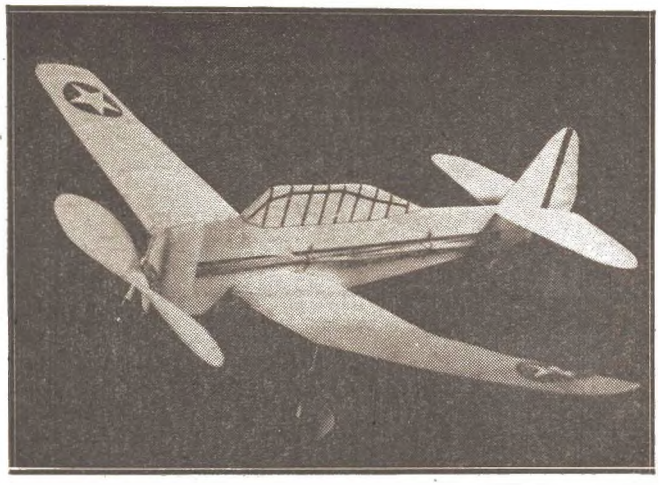


CARVE A GLOSTER BIPLANE FIGHTER—Plate 2



CARVE A GLOSTER BIPLANE FIGHTER—Plate 3





The author claims this ship can stand up with the best of the built-up flying scale jobs.

FLEETWINGS PROFILE FLYER

by Hy Scher

OF COURSE many model building fans will not agree with me when I contend that a well-built profile type flying scale model can outfly a built-up flying scale. If you're one of the disagreeing hordes, then an invitation is extended at this moment to disprove my contention.

On the opposite page you will find full size plans for building the profile model. Using the same outlines and dimension of the body you can build to your own design a built-up fuselage, attach the wings and tail surfaces and in general ready it for flight. Next, if you're still doubtful, build a model faithfully from the plans presented here. Take both crates outside and put them to the test. Don't say I didn't tell you.

The writer could spend more time in trying to convince you of the waste of time in building up a body just to house a few strands of rubber when you could just as well construct the profile-way and get as much if not double the fun flying it. But we won't. Information concerning the real ship will prove just as interesting.

First off, the Fleetwings Trainer is an all-metal job built by Fleetwings, Inc., of Bristol, Pa. It is almost 100 percent stainless steel construction. It has a double spar wing center section and a single spar outer wing panel which is detachable just outward from the landing gear leg. The ship is extremely sturdy in construction and offers excellent visibility to facilitate student instruction. Power is supplied with a Pratt & Whitney Wasp, Jr., of 420 h.p. It has a wing span of 40 feet. Length measures 29 feet 2 inches and height overall is 104 inches. At the time of this writing, the Army is giving the ship workout tests prior to ordering them in quantity. Its designation is known as the XBT-12 and when accepted for service the "X" will be dropped.

Helen Bauer built this ship from the designer's plans.

Fuselage and Landing Gear

FIRST MAKE a stiff paper template of the outlines of the fuselage and then lay the pattern over a carefully selected piece of balsa 1/8" thick. Trace its outlines with a sharp pencil point and then proceed to trim with a razor or sharp knife. Finish off the edges by sanding them slightly round and smoothing the fuselage in general. The next step is to outline the portion along the sides of the body which must be cut away to make room for the power strands.

The cowling pieces are made from 1/4" sheet balsa shaped in profile as shown on the plans. Before cementing to the sides of the nose, portions of the inner sides of the cowling pieces should be carved out to facilitate easy operation of the power strands. This will leave the wall at the rear of the cowling where the strands pass through about 1/32" thick.

Apply cement generously to the sides of the nose and the cowling halves and press the latter against the nose of the body firmly. After these parts have become hardened, sand the cowling all about so that its shape is exactly that of the cowling shown on the plans.

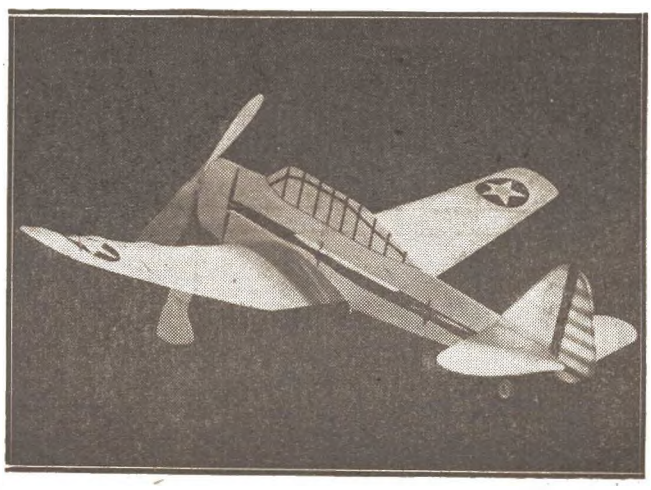
Soft music wire is used for the rear hook and is cemented into position as shown. The tail wheel fork is also fashioned from music wire. A small hard wood wheel serves the purpose. The "cans" are also shaped from music wire of the same gauge and cemented at the points along the fuselage as required.

The landing gear legs are made from hard sheet balsa in the fashion shown. Note that their upper portions are notched so that they may be cemented flat against the wing ribs. The outer sides of the wheel spats are made separately and are cemented to the legs. Music wire is used for the wheel axle. A pair of hard wood wheels are suggested in this case for weight value.

Wing and Tail Surfaces

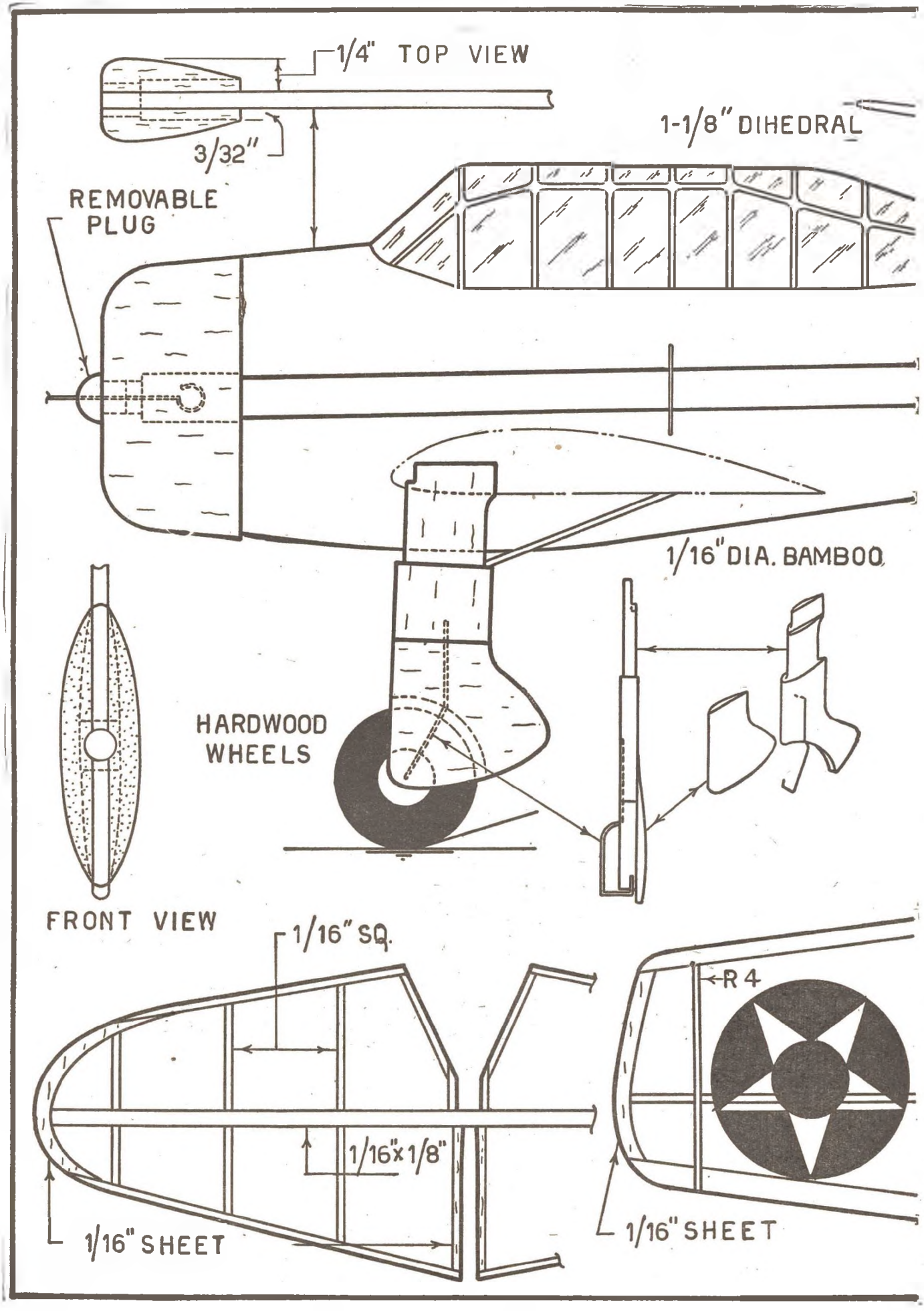
THE WINGS are made in halves. They are very simple in construction as can be seen on the drawings.

(*Continued on page* 71)

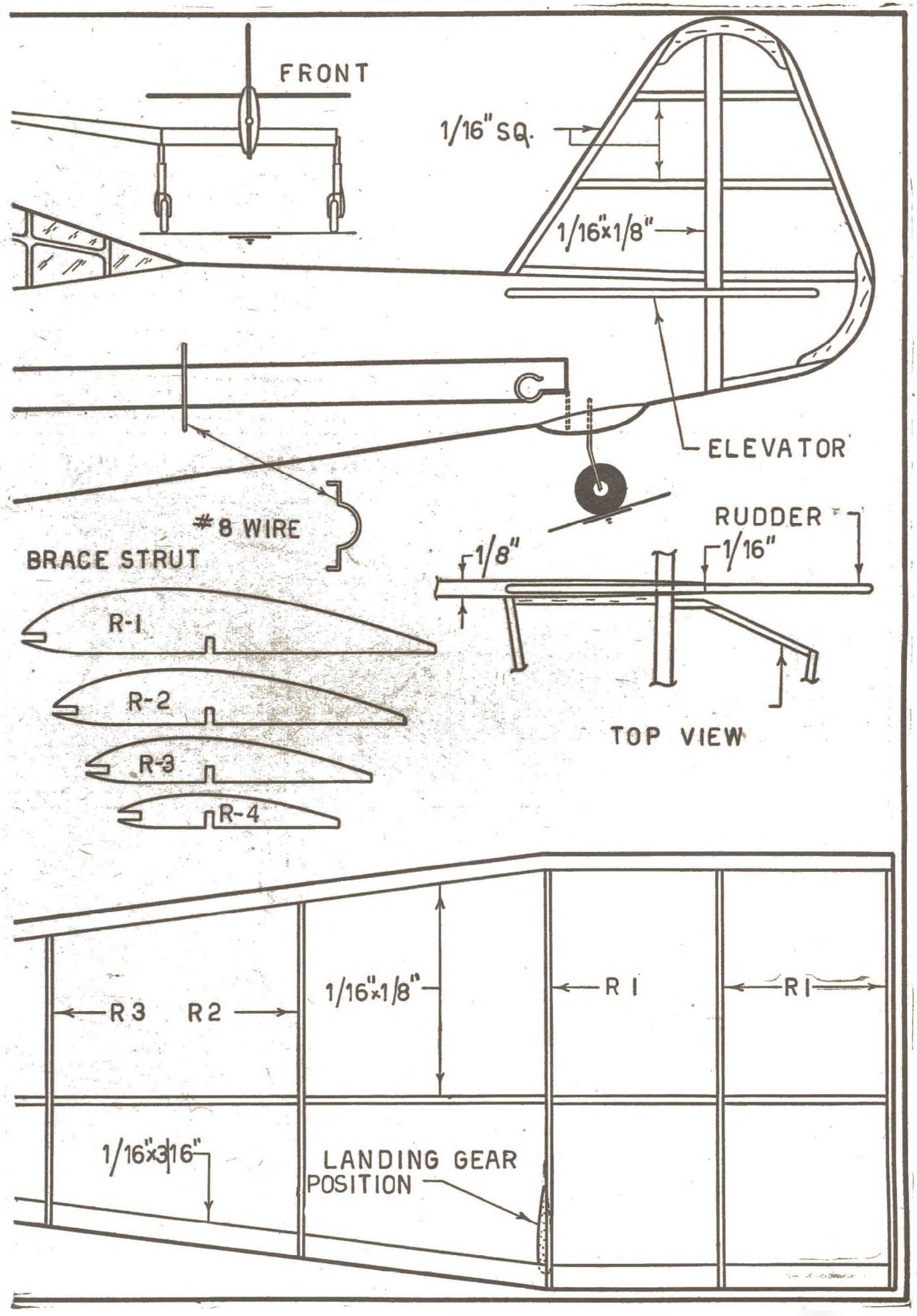


The little profile job looks like the real ship, alright.

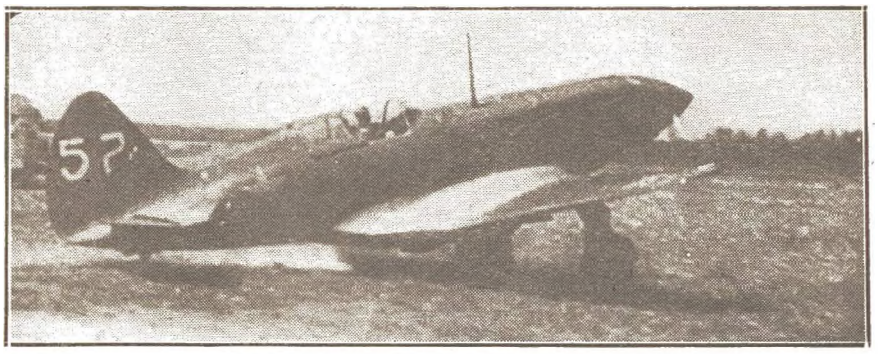
FLYING THE FLEETWINGS PROFILE IS FUN—Plate 1



FLYING THE FLEETWINGS PROFILE IS FUN—Plate 2



A Worthy Opponent to the Nazi Aggressors



RED AIR FORCE FIGHTER I-18

Plans by ALLAN HACKER

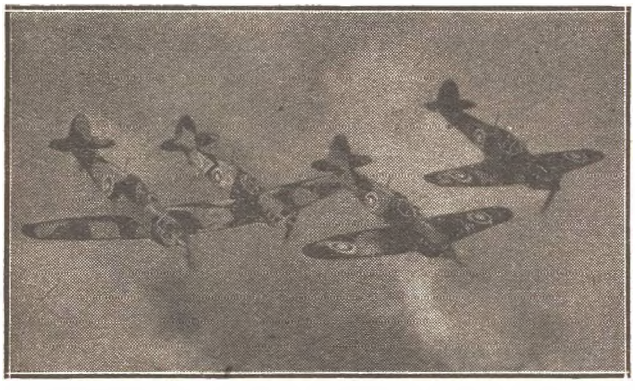
PROBABLY THE FASTEST and most formidable fighter of the Soviet Air Force is the I-18, which is powered with a 1,100 h.p. Mikoline engine. In combat against anything along similar power and design of German aircraft, the I-18 has shown its superiority both in speed and maneuverability. According to reports, the plane is armed with either eight machine guns or two cannon and four guns.

An original design, it seems to be a hybrid possessing recognizable features of other Allied craft. A glance at the three views on the opposite page reminds one immediately of our Curtiss XP-37 from which the now famous P-40 Tomahawk was developed. Only its inverted gull wings give it away. It even has a bit of our N.A. Mustang. Apart from its derivation the machine has the look of a thoroughbred.

Full details are lacking, but the following gives some idea of what it is and can do. Span, 37 ft. 6 ins.; length, 31 ft. 2 ins.; height, 10 ft. 6 ins.; wing area, 240 sq. ft. Weight empty, 5,000 lbs.; loaded, 6,200 lbs. Maximum speed, 360 m.p.h. at 13,000 ft.

THE END

HAWKER HURRICANE CUT-AWAY DETAILS — By J. B. RUST

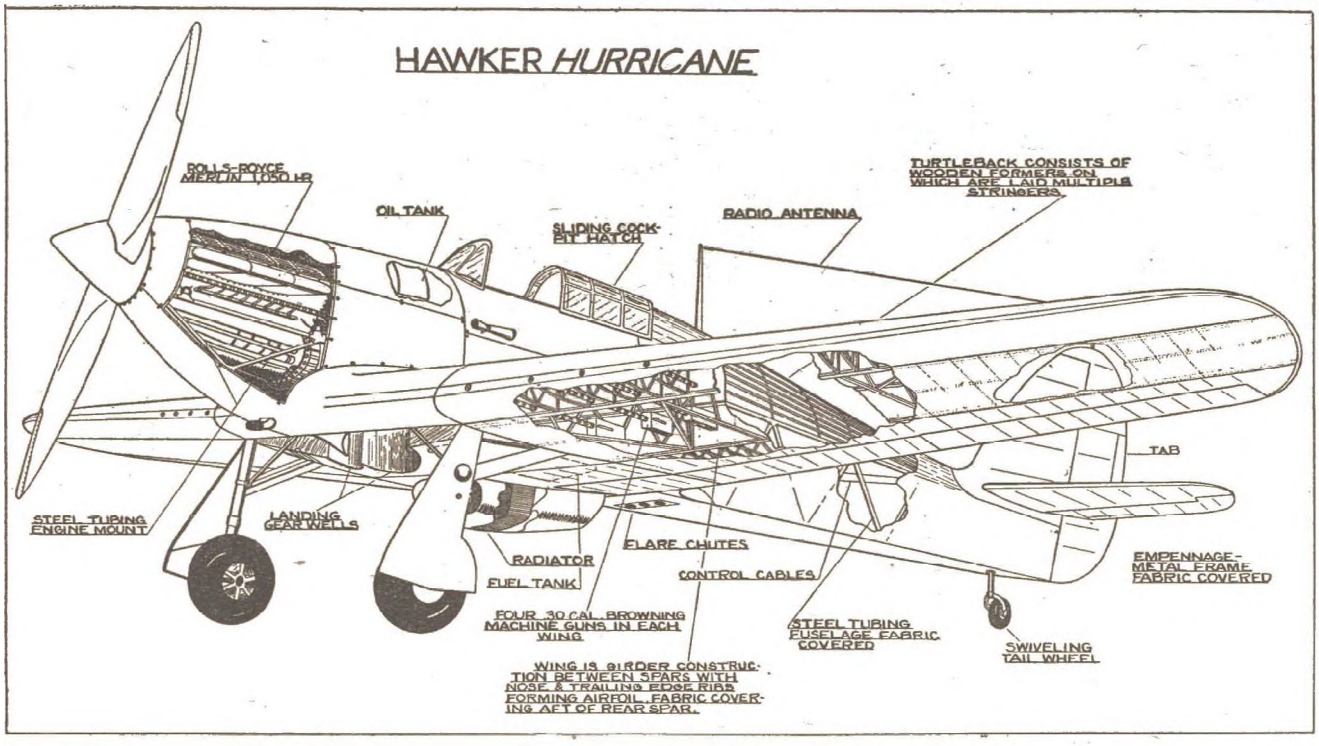


Sharing honors as one of the most famous fighting planes of World War II are Hawker Hurricanes as shown above.

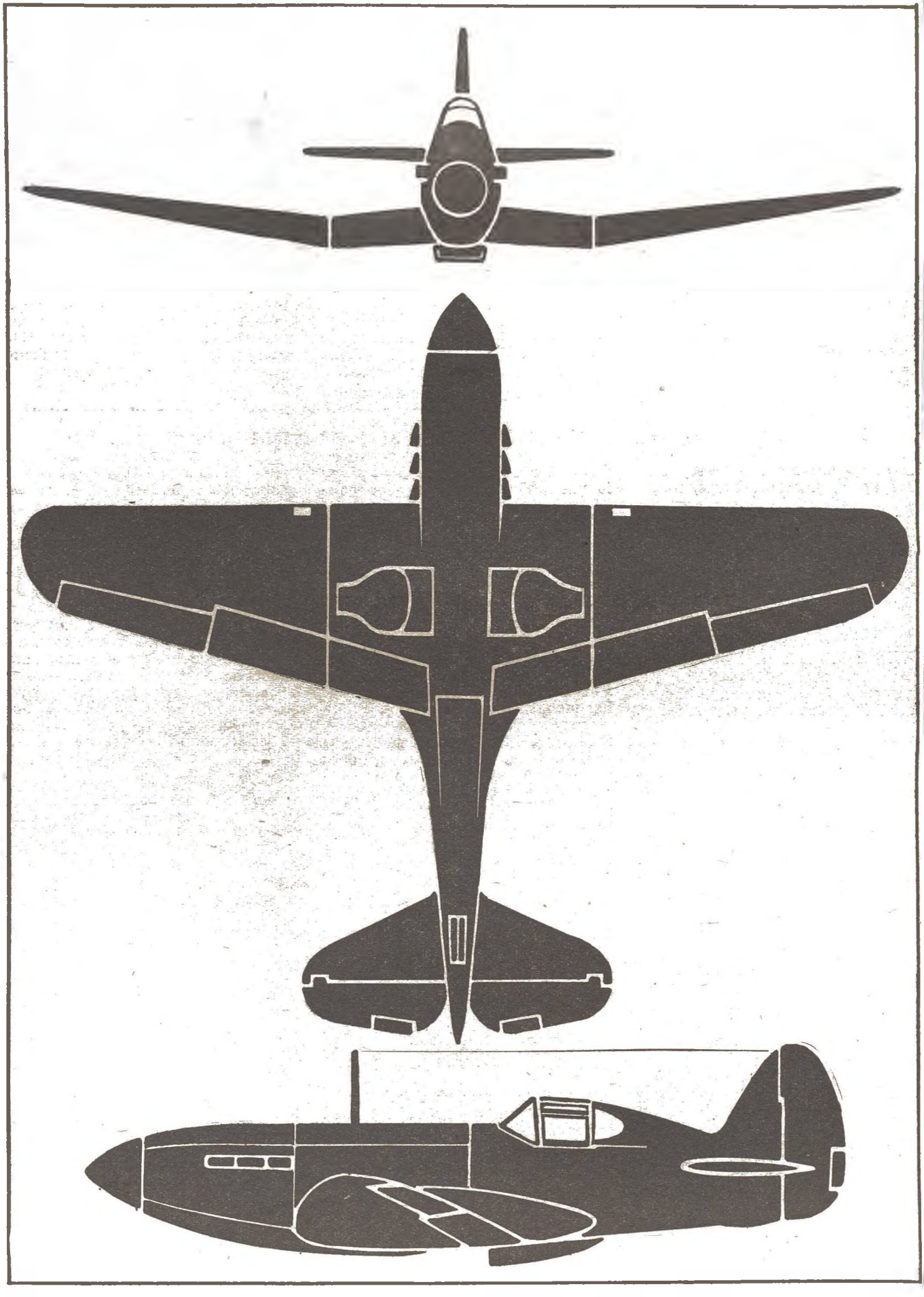
MODEL BUILDERS interested in constructing a built-up-scale job of the Hawker Hurricane I, will find this specially prepared cut-away drawing of great value in their work. A more recent craft is the Hurricane II which is said to be armed with 12 machine guns or four 20 mm. cannon.

The construction of both machines with the exception of where the wing gun and cannon emplacements are made, is just about the same. The turtle back is formed with stringers and is fabric covered. The drawing shows the Hurricane I equipped with a two-bladed wooden prop. Latest models have three-bladed controllables. These ships are camouflaged with patches of dark brown and spinach green. Fuselage insignia is encompassed with a yellow circle. Wing markings are in many cases just red and blue as well as the familiar tri-color. On the vertical fin are painted stripes of red, white, and blue with red nearest the leading edge.

THE END



RUSSIAN 1-18—8-GUN FIGHTER



You Said It!

Here's your corner, buzzards, and it's open to all readers who have a model argument they want to get off their respective chests. Make your comments short and snappy, and we'll try to squeeze 'em in.

S.O.S. Dept.

Model Editor, FLYING ACES:

I have been reading your FLYING ACES for about five years now and I thought it was high time I aired some of my own opinions. I have built many models (list too long to print, Editor), and they were all fine flyers.

In reading "You Said It," I see that fellows assert themselves straightforward and sometimes get results. I have an appeal to make. Perhaps some of your kind readers can help.

I ran out of rubber, tissue, and sheet balsa. I would deeply appreciate it if any American chaps would be generous enough to send me some. We can't get anything down here. I'd swap anything. Letters, N.Z. newspapers, journals, books, magazines, foreign coins, etc., for model supplies. I sure want to build models. So please. . . .

JEFFERY TIMS,
180 Stafford St.,
Timaru, New Zealand.

We'll Have 'Em All

Model Editor, FLYING ACES:

Yippee! We World War I advocates win! Honestly, I was so glad to read the announcement of the series of three-views that I am subscribing for one full year. I would like to see some of the following: Fokker E-111, Pfalz D-3, L.V.G., C-4, and the Sopwith Tripe.

EDWARD MOSER,
Louisville, Ky.

Loves-less Three Views

Model Editor, FLYING ACES:

Tell those prehistoric cavemen to go jump in the lake and take the World War three views with them.

JIM LOVELESS,
Bradford, Pa.

Yes, Please Do

Model Editor, FLYING ACES:

I'm working on a plane of my own design for a change and I'm calling it "The Victor." It's rubber powered and I think I may have something there. I'll write you about the results.

EDWIN A. TILL,
Fort Worth, Tex.

Exchange Dept.

Model Editor, FLYING ACES:

As long as good ol' F.A. rolls off the press I'll be around to read it. I'm going to build the "Moth" (August 1941 F.A.) because of the great endorsement it has received everywhere.

If anyone has plans of "Wartime Machine Guns" (August 1939 F.A.) I would gladly trade for plans of a glider and Aeronca profile job.

GRANVILLE MILLER,
North Street,
Westville, Nova Scotia, Can.

Model Editor, FLYING ACES:

Would someone please send me the plans of the Dutch Fokker D-21? It appeared in the February 1938 F.A.

JOHN STOUP,
560 West 165 St.,
New York, N.Y.

Model Editor, FLYING ACES:

My "Kaydet" (June 1939 F.A.) turned in many good flights. But the plane got lost and so did the plans.

Logging the Motor Market

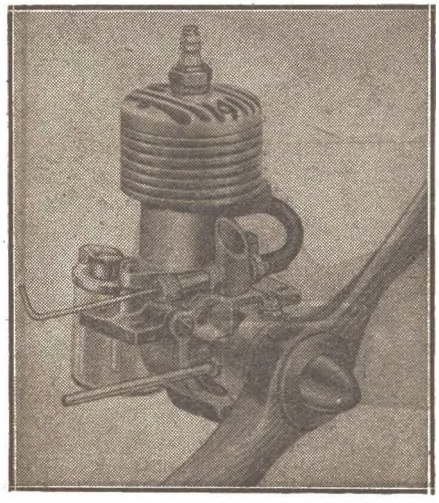
Dreadnaught "19"

THIS ENGINE, a little heavier than the average Class "A" types, develops 1/7 horsepower. Although placed in production very recently, its popularity has become widespread and accelerated production is now under way.

The pistons and crankshafts are individually lapped. The cylinder is machined from Meehanite Iron and micro-finished to .0001 tolerance. The piston is also fashioned from the same metal. The crankshaft is machined from solid alloy steel, and individually lapped. An enclosed timer is fully adjustable.

The engine is designed to swing a propeller of 10" diameter from 6,500 to 9,000 revolutions per minute. Two cycle, three port, rotary valve, it has a suction type gas feed, and four bolt lug mounting.

Specifications: Bore, .620; stroke, 21/32; cubic inch displacement, .199; weight, 6 ounces. Engines shipped with coil and condenser, and are fully block tested and guaranteed against defective workmanship. Manufactured by the Dreadnaught Motors, P.O. Box 647, Oakland, Calif. Price, $12.50. Say you read about it in FLYING ACES when requesting more information.



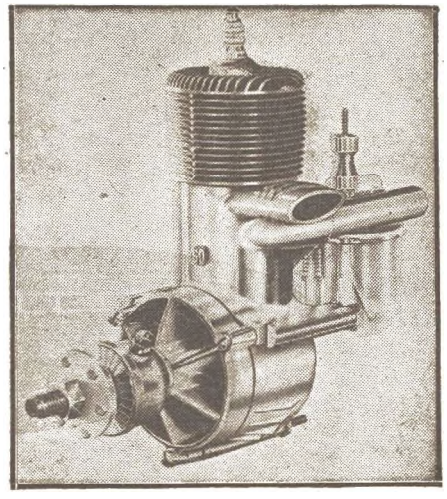
Ohlsson "60" Special

THE OHLSSON "60" for 1942 boasts of several new features. Designed for operation in 6 and 7 foot Class "C" ships, it has a "hi-compression" domed head piston, heat treated to glass hard surface and ground. Piston and cylinder lapped to 1/20,000 of an inch of perfect roundness.

A tool steel crankshaft with integral crankpin counterweight, and timer cam, are machined from solid bar alloy steel, hardened and ground. It is equipped with twenty-one roller bearings and eight thrust bearings. Its fully enclosed timer has fine tungsten points and its easily replaceable steel springs are capable of operating up to 20,000 r.p.m. without flutter. Forty-six cooling fins make for maximum heat dissipation.

Specifications: Bore, 15/16"; stroke, 7/8"; cubic inch displacement, .60; 7,500 r.p.m.; static thrust 4½ lbs.; bare weight, 9 ounces.

Furnished complete with coil and condenser and block tested before shipment. Guaranteed against defective workmanship and materials. Price, $18.50. May be purchased at all model motor dealers or from factory. Address, Ohlsson & Rice Mfg. Co., P.O. Box 2324 Terminal Annex, Los Angeles, Calif. Say you read about it in FLYING ACES MAGAZINE when writing for information.



Left: The Dreadnaught Motor "19".
Right: Ohlsson "60" Special.

I'll trade the "Hurricane" and the "Thermal Chaser" for a new set.

CHARLES BREWER,
702 Delmar Ave.,
Festus, Mo.

—Numerically Speaking

Model Editor, FLYING ACES:

I am writing to complain about the "Whisper Glider" (February 1941 F.A.). They disappear *too* fast. The first one left me on the third flight. That's the second time it happened. Four others went west, too. I also built the "Class 'B' Soarer" (March 1941 F.A.) which didn't go so hot. At least I still own it.

Bayside, New York
ROLF CARKEN,

Model Editor, FLYING ACES:

I've been reading F.A. for three years, and your model section is tops with me. I've built 2 "Kaydets" (June 1939), 5 "Whisper Sticks" (Feb. 1941), 10 "Contest Soarers" original plan size (June 1939), "Gull Sport" (Nov. 1940), "Hi Climber" (Aug. 1939), "Sportster S-2" (Sept. 1939), "Snoony Silhouette" (May 1939), Army "BC-1" (May 1941), and the "F.A. Moth" as a seaplane and landplane (Aug. 1941).

All these models are excellent performers. I also carved out a "Brewster Fleet" (Sept. 1940) of pine wood. I also agree with Don Vinson in having First World War solid models printed again.

"COLONEL" JOE CLARK,
Louisville, Ky.

You Can Never Tell

Model Editor, FLYING ACES:

Is the "Moth" (August 1941 F.A.) a privileged character? How about reprinting plans for the other snazzy looking outdoor jobs of the past? I'm sure if a movement got under way you editors might see the light.

HARRY MCKAY,
Philadelphia, Pa.

Air Photo Fan

Model Editor, FLYING ACES:

My hobby is taking pictures of airplanes. I would like to trade photos with other readers of this department.

ARTHUR SUTTER,
5672 Keith Ave.,
Oakland, Calif.

Model Editor, FLYING ACES:

I'd like to swap my stamp collection for a gas engine in good operating condition. My collection has around 720 stamps, hinge mounted, and in excellent condition. How about it?

ROY K. KRAMER,
Hamberg, N. D.

Likes Present War Drawings

Model Editor, FLYING ACES:

Seeing all the fuss raised about getting World War I plans printed in the magazine, I would like to see how well I could do about getting more present war jobs published. I built your Fairey Fulmar and Martin Maryland, both in the November 1941 F.A.

Is it possible to try for the D.S.M. with only a pilot's rating?

ROLAND LEROUX,
Montreal, Can.

Editor's Answer: Any member of the Flying Aces Club may enter his photo for D.S.M. consideration regardless of his rating.

Paging Claude McCullough

Model Editor, FLYING ACES:

If I wasn't 150 miles away from Tommy McCabe I would smother him with love and kisses for starting the ball rolling to get the "Moth" (August 1941 F.A.) reprinted. I was one of those who missed it.

Please put Claude McCullough in a special detention cell until he agrees to design a one inch to the foot perfect scale model of the Fairchild amphibian with detailed motor and interior.

Also, how about a four or five foot China Clipper in F.A.? If you print these plans I promise to buy F.A. for the rest of my natural life. Many thanks for the Luscombe "Casey."

DEAN OBRECHT,
Geneseo, Ill.

S.O.S. Dept.

Model Editor, FLYING ACES:

Any fella who wants to have the undying gratitude of a dying-to-get-his-hands-on-it model builder, just send me the plans of the "Spitfire" which was published in the May 1941 F.A. Thanks.

"RED" LATIMER,
Route 1, Box 26,
Mt. Calm, Tex.

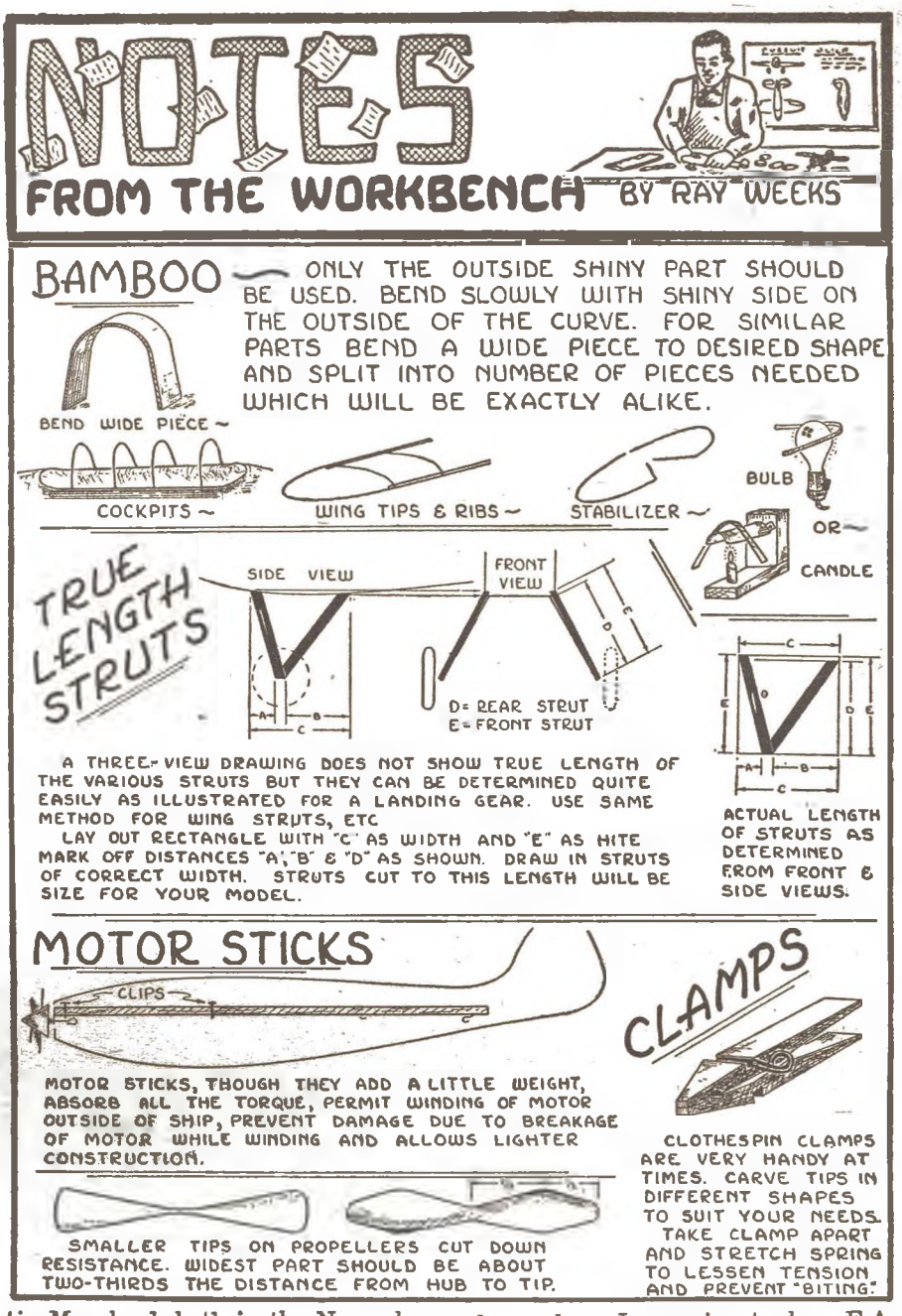
Model Editor, FLYING ACES:

To those who are glider enthusiasts I recommend the "Cloudsweeper" by George D. Brown (December 1940 F.A.).

The first day I completed mine it made a 35 second flight. Not bad, eh?

BOB WALLACE,
Portland, Oregon.

THE END



FLIGHT OF THE DEAD

(Continued from page 21)

speeding after it in a cross-wind take-off. Von Igel's wing-lights went on to spot the boundary, then he lifted in a steep climb.

"Take it, Lothario!" Knight tossed back, as the Nazi's lights twisted back toward the field. "Yell when you're set!"

He felt the Vought take-off, bank almost instantly. The brief impact of bullets clipping the wing sent vibrations through the ship. He caught the acrid smell of tracers as the Plexiglas enclosure crackled overhead. The Vought's wings howled in a swift chandelle.

"Comin' on th' range!" bellowed Doyle.

Knight threw the gun-circuit switch to the rear-stick position. The Browning .30's chattered sharply, and Doyle gave a yell of satisfaction.

"Clipped his tail-feathers! He's cut off his lights."

Knight shook the front-pit stick, took over as his dark-vision returned. He grinned as he saw von Igel twist in a hasty renversement. In a fast climbing turn he reached the Nazi's level, loosed a quick blast. The bright tracers partly dulled his vision, but he saw von Igel zoom frantically. He sent another burst past the Scout's right wing tip, then a short blast past the left.

Von Igel nosed down an instant, as though obeying that fiery command to land. Then with a lightning Immelmann he was out of range and streaking for the clouds that hung at five thousand feet. Knight followed through as fast as he could, but the Curtiss job had the lead and vanished in the clouds.

Knight went on up through until he was on top the clouds, at seven thousand. He saw an airliner angling down toward Washington Airport, but no trace of the Nazi ace.

"I guess I'd better retire from this game," he told Doyle glumly through the interphone. "To think I had that rat right in my hands and let him escape. And with our ship, too!"

"If that Navy bird hadn't turned on the flashlight, we'd have been all right," growled Doyle.

"It wasn't his fault. I should have had von Igel tied up. Navy and F.B.I. will certainly give me the laugh."

"That ship's bound to be picked up," said Doyle.

"Not unless he gets careless. There's enough gas to get him into Mexico. He could ditch the ship somewhere and find a Nazi agent to help him get back to Germany. That is, if he wants to get there—which I doubt."

"Wonder what his game was," Doyle said.

"Maybe we'll find out something at the Barton plant. Von Igel was in on that; I could tell from the way he jumped when I mentioned it."

TWENTY-SEVEN minutes later, Knight nosed the Corsair down toward the Barton landing field. Both the field and the plant had been surrounded by a twelve-foot steel fence since the Jap war started. On the road to Lanesville, and close to the factory entrance, a number of cars were drawn up. He could see a single-motored cabin plane inside. Probably that was the ship the F.B.I. agents had chartered to fly up from Baltimore.

Several men came out of the plant as the Vought landed. Knight taxied up near an engine-testing stand, cut off his engine. A man in watchman's uniform started over, hand on his pistol. Knight climbed out, and Doyle followed.

"Never mind, officer, I know these men." It was Robert Anderson, senior F.B.I. agent from Baltimore. Short, thick, gray at the temples, Anderson had a perpetually worried expression.

"Hello, Andy," Knight greeted him. "Broken the case yet?"

"No, maybe never will," Anderson shrugged. He eyed the Vought. "I thought you were coming in a Curtiss."

"So did I, but a chap by name of Baron von Igel beat me to it."

Anderson stared. "What's this about von Igel? I thought he was dead."

"I'll explain inside. I'd like to see this mysterious sabotage. The papers didn't give any details."

Anderson motioned them to follow. "Come on, we'll go in the side way. I'll have the lights turned off in the wrecked part, after Doyle here gets a look at it. You know the set-up, that the plant wasn't operating?"

"No," said Knight.

"They had a strike. Oh, it's not any sabotage by the workmen. No one's been in the plant for five days. The only men around were the watchmen—three on duty all the time, changed every eight hours. There wasn't any picket line; Barton agreed to shut down. The strike was settled late this afternoon. Around ten o'clock a detail came out to get the plant ready for regular work in the morning. Barton was with them. No watchman was at the gate, so he had the men break it in. They found the gate man over by the test-stand—the engine was running, by the way—and he'd been dead about half an hour. Stabbed, but no knife found. The other watchmen simply disappeared. And inside the plant—well, you can see for yourselves."

Anderson led Doyle inside, came back in a few minutes for Knight. The lights were off and Knight helped the F.B.I. man into the darkened plant. Then he stopped, staring around in amazement.

Black-rimmed holes had been burned through wing after wing of the Barton bombers lined up on the assembly line. Rudders and elevators had likewise been burned through. The stench of burned rubber filled the air, and Knight saw that most of the tires had been destroyed. Tips of propellers had been melted off and some powerful flame had eaten through cylinder walls. On a nearby bomber, the whole left wing sagged to the floor, where the steel had been weakened by some terrific heat.

"Well?" Anderson's voice came grimly out of the darkness.

"It's the most hellish thing I've seen for a long time," muttered Knight.

"What you see is only part of it," said the F.B.I. man. "The instruments on all thirty ships were burned or smashed. Control cables and rods are cut, and all the electrical equipment is ruined. Some of the lathes and machine-tools are wrecked. If they'd had more time, they'd undoubtedly have destroyed everything of value."

"I still don't see why it wouldn't have been easier to set the place on fire," interposed Doyle.

"Lanesville has a special fire department paid for by Barton," said Anderson. "They might have got out in time to save the place. It's also got automatic sprinklers and fire-doors that close off different sections. Also, whoever did this might not have been able to get away before the fire trucks and police arrived."

KNIGHT rubbed the blackened metal around one of the holes. "Must have been powerful blow-torches to do all this."

"That's what I figured," agreed Anderson. "But how did they do it and make their getaway in such a short time? The gate watchman reported everything all right at nine o'clock, when Barton phoned him that the make-ready gang would be out at ten. The top wire of that steel fence is charged with enough juice to knock a man unconscious. There's a burglar alarm—"

"Mr. Anderson," a voice interrupted, back at the doorway. "Those workmen want to know if they can go home, or if you want to question them any more."

Knight looked around. It was the watchman who had met them.

"You can let them go," said Anderson. "Tell them not to talk to anybody about it."

"Yes, sir. And there's a message from Washington. A Wing-Commander Temple is flying up here to see Mr. Knight."

"That's the British air attache," Knight cut in. "It's okay, Andy. My mention of von Igel seems to have stirred him up."

When the watchman had gone, he explained about the crash and von Igel. Anderson, at first amazed, shook his head unhappily.

"If you'd only hung onto him, Dick, we might've solved this tonight. As it is—" he stopped as a plane droned overhead. "Maybe that's your Eng-

lishman. He ought to be here by now."

"It's goin' on by," put in Doyle. "Two-engine job, probably an airliner."

Knight nodded absently. "What about Barton, Andy? Did he have any idea trouble was coming, any warning or threats?"

"If he did, he never mentioned it. He's out there in the watchman's office, by the main gate. You can talk with him if you want to. I want to turn on the lights and check this place more carefully."

"I'll go outside," said Knight. "Lothario, you stick with Andy. If you find anything now, come and get me."

He went outside, turned toward the front of the plant. Suddenly he jerked to a halt, staring upward. Under black parachutes, more than a dozen dark figures were swinging down toward the field!

The plane from which they had jumped was slowly circling back at four thousand feet. It looked like an old Curtiss Condor transport.

The first parachutists were less than three hundred feet from the ground. Knight wheeled to run back and warn Anderson. He almost collided with a hooded figure that had stolen up behind him. The man's lifted hand whipped downward.

But for his dark-vision, Knight would never have seen the descending knife. He leaped aside, caught the man's wrist and gave it a vicious twist. The hooded assassin dropped the knife, with a groan. As he fell to one knee, Knight let go his wrist. Instantly the other man charged, his head down to hit the Q-agent's stomach, while his left hand clawed at his holstered gun.

Knight sprang back, kicked the gun from the man's hand. The hooded figure lunged after it. Knight straightened him up with a left to the chin. The man stumbled back, and Knight put everything he had into a furious right hook. The chutist went down in a dark heap, and stayed there.

Knight looked around hastily. All but two of the parachutists were on the ground, and there had been no alarm. With a sinking feeling he saw that several had Tommy guns. It was too late for direct attack. The small group at the plant would be no match for these heavily-armed men.

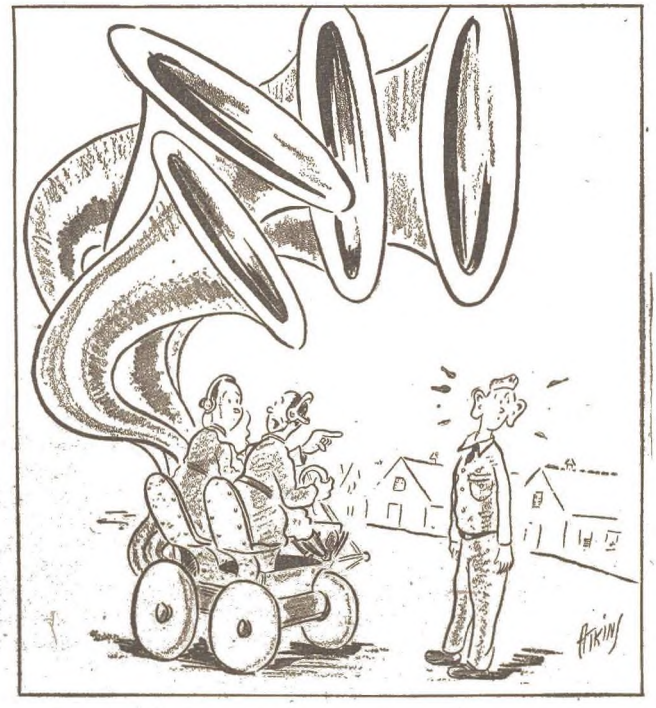
TAKING the assassin's gun, he hoisted the limp figure onto his back. The nearest concealment was a freight car on a siding two hundred feet away. He waited until a descending chutist had landed, off to his right, then he headed to the left of the car.

Just in time, he rolled the unconscious man underneath the freight car and crawled in beside him. The man who had just landed quickly unhooked his chute and ran by the car. Another hooded figure in black joined him a few yards distant.

"Donnervetter!" one man said harshly. "Another second and I would have landed on that fence. We are fools to come back here tonight."

"Der Leutnant said it was the Baron's order," the other Nazi said stiffly. "Come—we cover the side exit. Remember where you leave your parachute."

Knight hurriedly undressed the man he had knocked out. There was no time to make a complete change. He put on the man's black shirt, hood, and chute-harness, then fastened the gun-belt around his waist. In the darkness, they would not be able to see that he wore trousers instead of breeches and boots. And if lights went on he would be lost anyway.



"Darn it, he locates 'em quicker than we do!"

He stiffened. A cry, abruptly cut off, had come from the front of the plant. He ducked out from under the car and ran toward the spot, pulling the hood over his face. From the corner of his eye he saw the Condor gliding in flatly, engines cut off. And circling down above it came the SO3C-1 in which von Igel had escaped.

The odds were rapidly increasing. Knight gripped the automatic in his belt, pushed by another hooded man. Then he stopped, with mixed gloom and relief. Anderson's two F.B.I. agents and the gate-watchman had been overcome, but they were still alive. One agent was on the ground, struggling as three Nazis bound and gagged him. The watchman and the other agent were being marched into the office by the gate.

There were only five of the hooded men at the entrance. The rest, Knight knew, must be at the other doors, or inside the plant. He thought of Doyle and Anderson, edged closer to a husky Nazi with a Tommy gun, who seemed to be in charge. Another hooded saboteur stood with a flashlight tilted skyward, blinking out a signal.

The SO3C-1 sideslipped for a quick landing, its lights flashing on at the last moment. Knight turned his back to keep from being blinded. When the lights went out, von Igel had switched off the engine and jumped down.

"Leutnant Skalb!" he said sharply.

"Ya, Herr Baron," said the husky group-leader.

Von Igel strode up. He still wore the wet clothes and Knight saw he was shivering.

"Is everything all right?" von Igel asked Skalb.

"We have control here, but—" the *Leutnant* lowered his voice— "some of the men are complaining. They say two jumps in one night are bad enough, but to come back here when we barely escaped—"

"So they complain, do they?" rasped von Igel. "Let them complain to me and I will soon settle them."

None of the hooded men spoke. Von Igel turned back to Skalb.

"Get me some dry clothes—you can strip one of your prisoners. I'm half frozen, thanks to one of your *Dumkopf* guards."

Skalb sent a man into the watchman's office. "But I don't understand about the guard, *Herr* Baron," he began. "Your code message said you crashed but had taken another plane. How could a guard be—"

"I crashed because Roetger got loose with a pistol," snapped von Igel. "After you took-off, I got into the Northrop to follow you here. Ventner, my gunner, should have been in the rear. It was dark and I didn't look closely. Before I could take-off, there was a gun at my back. It was Roetger. He had a strait-jacket and he made me put it on. Then he took-off. He was going to land at Washington and tell them, but I got one hand free and seized the controls. We crashed in the river. I finished Roetger, but those two *verdammt* secret agents were waiting for me."

He stopped as a Nazi came out with word that dry clothes were ready. Von Igel and Skalb went into the little house.

Knight looked carefully around him. He could not rely entirely on the darkness to conceal him. The eyes of these hooded men would be partially accustomed to the gloom. But if he could catch them off guard, seize one of the Tommy guns . . .

"Ach, here are the other prisoners," said one of the Nazis. Knight looked toward the main entrance of

the plant. Six black-garbed men were emerging with Doyle and Anderson. The prisoners' hands were tied behind their backs.

CHAPTER III

PADDED CELL

VON IGEL came out of the watchman's house, buttoning a tweed coat about him, just as the Nazis halted with the two men. The light from inside fell across the group. The reflected glow blurred Knight's vision, but there was no doubt as to von Igel's reaction.

"Where is the other prisoner—Knight?" he grated.

"There were only these two inside, *Herr* Baron," one of the Nazis said uneasily.

"You fool!" snarled the ace. "He's tricked you! He was in that Vought with this broken-nosed devil."

Skalb had followed von Igel outside. He closed the door, and Knight saw the quick fear that came into the *Leutnant's* face.

"What if he got over the fence? He may bring the whole town down on us!"

"He couldn't get over it," von Igel said tautly. "The upper wire is charged with electricity. He's hiding somewhere. Spread out and find him!"

Several of the hooded men hurriedly started to obey. Knight felt his pulses quicken. This might be a break, after all. But von Igel glared at him through the shadows.

"What are you waiting for?" Knight silently turned away, but Skalb broke in: "*Herr* Baron, we had better get our engines started, in case anything goes wrong. After all, this man Knight is only one *Amerikaner* agent to be eliminated."

"*Only* one agent?" retorted von Igel. "The Gestapo says he is none other than 'Q'—the spy who caused us so much trouble these last four years. But that is the least of it. He recognized me tonight. If he ever gets to the British, the truth will be out and we'll be trapped."

"All the more reason then—"

"Listen!" Von Igel cut the lieutenant short. "I heard a plane. Is that the other Condor?"

Skalb shook his head. "I ordered them to remain at the hangar. This sounded more like a single-motored plane."

"Order the engines started—my ship first!" snapped von Igel.

Skalb shouted across at the Condor. Knight saw one of the men climb inside the big ship. The other darted across to the SO3C-1.

"What about the prisoners?" Skalb asked nervously. "Besides these two there are the ones inside. We can't take more than two or three in the Condor."

"All I want are Knight and this man Doyle. We can finish off—" the rumble of the SO3C-1's engine drowned the rest. The man at the controls had failed to set the parking-brake, and the ship rolled halfway to the gate before he stopped it. Von Igel shouted at him and Knight took quick advantage of the diversion to brush close to Doyle.

"Be on your toes, Lothario," he said swiftly.

His voice was raised just enough for Doyle to hear him above the engine. But he was only half-finished with that quick warning when the man in the Navy ship idled the engine. Von Igel spun around, as Knight's "Lothario" became audible.

"Who said that? Skalb, cover these three men until—stop him, somebody!"

Knight had hurtled against Skalb, sending him headlong into von Igel. Before either man could recover, he ran under the Navy ship's wing and leaped to the step. The man at the stick cut off the engine, jumped up and drew his gun. Knight's gun blazed a split-second ahead of the Nazi's. The German broke at the waist, toppled out of the cockpit, and thudded to the ground. Knight was already clambering into the rear pit. He whirled the twin .50's, flipped the muzzles down at von Igel and his men.

"Drop your guns! Get your hands up! *Hoch!*"

Pistols and Tommy guns clattered, as the nearest Germans obeyed. From over near the Condor, an automatic rifle broke into staccato fire. Bits of Plexiglas flew into Knight's face as bullets drilled the enclosure. He spun the twin-mount, and the .50's let go with a roar. The Nazi tottered back under the impact, collapsed on his face.

A pistol barked from behind Knight. The black hood twitched, and something like a hot iron grazed the lobe of his ear. As he whirled the guns back he saw von Igel drop the automatic he had snatched up.

"Don't shoot!" he cried. "You've got us."

"Another move like that and I *will* have you," Knight said curtly. "Tell your *Leutnant* to untie the prisoners. You stay put."

Von Igel's swarthy face showed a baffled fury. He jerked his head toward Skalb and the Nazi lieutenant started to unfasten Doyle's bonds.

"Watch out behind you, Dick!" Doyle exclaimed. "There's still a man in that Condor."

"I'm going to leave him to the baron," Knight said grimly. He let the .50's point directly at von Igel, "*Mein Herr*, my finger's on the trigger. Even if I get shot, I'll still have time—"

Knight stopped as from somewhere overhead came a faint moan of wings. An engine blipped, and then without the slightest warning a parachute flare blossomed in the sky. Knight threw one hand before his eyes as the dazzling glare struck them.

"Dick!" he heard Doyle shout desperately, above a sudden hubbub of voices. "Dick, for Heaven's sake, shoot!"

But Knight let the gun mount drop from his grasp. To fire now, blindly, might mean hitting Doyle or Anderson. He felt the ship jerk as men leaped on the wings. Someone clawed at his arm. He struck out savagely, heard an oath as his fist connected with flesh and bone.

Then something struck the side of his head with stunning force. All the dazzling light of the flare seemed to repeat itself inside his brain. He felt himself falling. It seemed he would never stop. And then, abruptly, all sound and feeling were gone.

WHEN DICK KNIGHT opened his eyes he found himself in total blackness. He lay without moving, dully aware of a throbbing pain in his head, until memory came back.

He seemed to be lying on a mattress, but it was oddly unyielding. He turned over, sat up with a muffled groan.

"Dick!" Lothario Doyle's voice came anxiously out of the blackness. "Dick, is that you?"

"It must be—I'm not moving," said another voice with a weary boredom.

"Who's that? What the devil is this place?" Knight said thickly. Then he realized there was a bandage around his head, covering his eyes. He shoved it up enough to see underneath.

A few feet away sat Doyle, a purple bruise on one cheek. Behind him was a padded wall, the same as the floor on which Knight lay. He stared around. Leaning against the opposite wall was Wing Commander Gerald Temple, the British air attaché. Temple was a lean man, habitually skeptical, and possessed of a weary dignity. Just now, that dignity was somewhat impaired by a black eye.

"Are you all right?" Doyle asked. "You've been out cold about an hour."

"What hit me?" asked Knight.

"A fire-extinguisher. You're lucky your skull ain't cracked."

"How'd you get in here, Temple?" asked Knight.

"Eh? Oh, I've a gift for this sort of thing; always dropping in at the wrong moment. I was the one who let go the flare."

"Yeah," growled Doyle. "If you'd kept your nose out of it, we'd have been all right."

"Never mind, Lothario," said Knight. "We're here. By the way, just *where* are we?"

"In a padded cell, what's it look like?" Doyle said morosely.

"We've no idea even what State it is," Temple said wearily. "Not that it makes much difference. They've got us here, and we can't do much about it."

"What happened after I got knocked out?" queried Knight.

"They grabbed me and tossed me into the Condor, tied up," said Doyle. "Anderson tried to run and they shot him. I think they left the rest tied up in that watchman's shanty. They were afraid Temple was the Navy or the Marines."

"This von Igel was quite annoyed," said Temple. "They dragged me out

of my ship and put me in with Doyle. When we landed it was still dark. From what little I could see, they must have leased a second-rate flying field near a private sanitarium. The sanitarium, of course, is the hiding place for von Igel and all the escaped prisoners."

"Prisoners?" exclaimed Knight.

"They had 'em up in Canada, at a camp in the wilds," interjected Doyle. "He's been tellin' me all about it. They framed a break, made it look as though the whole outfit got drowned while tryin' to cross a lake in an old boat."

"We'd written off von Igel and some fifty of the Luftwaffe," said the wing commander. "The Nazis had been saying he was dead, trying to get us to announce something about him. They didn't know where he was."

"So that's it," muttered Knight. "A sabotage mob, hiding out in a private asylum. The place is probably run by a pro-Nazi."

"Yeah, and that flying service must've been taken over just for this business," added Doyle. "With those old Condors, they'd never have to worry about people rushin' them for taxi jobs. But they sure can carry a load. I saw two big portable torches and tanks in there when they dumped me up forward."

"It must be something like oxygen-acetylene, to burn the way it did," Knight said grimly. "We've got to find some way out of here or those rats may wreck a hundred defense plants before they're caught."

"Take a look," Doyle said, with gloomy sarcasm. "Maybe your X-ray eyes can see some door we overlooked when we tapped around."

"At least they didn't put us in strait-jackets," replied Knight. "Say, this explains how Roetger got hold of that jacket. They must have kept him here."

"Roetger was at the same camp in Canada," interrupted Temple. "We had to intern him, as he was still a German citizen. But we had in mind a citizenship plan, in return for his help on some high-speed plans."

"That's probably why von Igel took him along, to keep you from getting better ships," conjectured Knight. "He tried to put us on the wrong track after the crash, with some wild babbling about flying from Europe."

HE STOOD UP, examined the walls. There was only one exit, a heavy, padded door, obviously barred on the outside. A tiny grilled opening at the top furnished the only ventilation.

"Find any secret panels?" grunted Doyle.

"No secret panels." Knight's glance rested for a moment on the wires which ran to the unlighted electric fixture overhead. "No, it looks as though we're stuck here until they raid this place."

"Raid? Who—when?" exclaimed Doyle. "You mean you left a trail for them to follow?"

"Hold on," said Knight. "Maybe

World War Books

Volumes reviewed in this department may be obtained from Airbooks, P. O. Box 958, New Rochelle, N. Y. Airbooks cannot promise to in all cases supply books for the prices quoted, since the price is determined by demand. It is suggested that two or more alternative titles be chosen when ordering, in case first selections are not available.

High Adventure, by James Norman Hall, $3.75.

Ranked as one of the best World War aviation accounts, James Norman Hall in this book depicts his own and others' experiences in the Lafayette Escadrille.

The book is written in Hall's usual style, without flourish but with that touch writers usually try so hard to achieve but usually don't quite reach. If you have ever had *any* questions concerning flying in France against the Germans, this book will answer them thoroughly. Too, there are 38 exceptionally clear photographs showing various phases of World War aviation.

One of the most interesting bits of information we found in the book was in the Introduction, which was written by Major Edmund Gros. There it is told just how the famous Lafayette Escadrille gots its name.

Heroes of Aviation, by Laurence La Tourette Driggs, $1.75.

You have read and talked about the Aces, but as far as their general personal exploits or histories are concerned you probably know very little. Here is a book that will give you that reference material.

One would ordinarily suppose that accounts of this kind would be dry, being merely historical records. But such is far from the case, for the author gives more of a personalized account of the Aces rather than a historical or biographical one. *Heroes of Aviation,* in fact, is as readable as any book could possibly be.

If it were only for the chapter devoted to Raoul Lufbery, this book would be well worth the small $1.75 asked for it.

Letters from a Flying Officer, by Rothesay Stuart Wortley, $2.25.

This volume was published in England and is about an Englishman and his experiences in France as a pilot. The Foreword is by Duff Cooper and John Buchan, telling of Wortley's early life and how he eventually was transferred from the infantry to the Royal Flying Corps.

The volume is made up, as might be expected from the title, of reproductions from Wortley's diary and letters he wrote "back home" while at the Front. These really make excellent reading material.

The author unfortunately passed away many years ago, but his foresight was really astounding. For the last paragraph of the book reads: "The next war, if and when it comes, will not be prefaced by diplomatic declarations. It will come unheralded, unannounced, unlooked for; it will come like a thief in the night. . . ."

Cavalry of the Clouds, by Capt. Alan Bott, $2.50.

There is really nothing extremely spectacular about this book, but it is a good account of the experiences fighting pilots had in the World War. In fact, it is probably as good a personal account as can be found. The best part of *Cavalry of the Clouds* is devoted to actual flying, with other phases of an aviator's life touched only lightly or skipped entirely.

This book, naturally, was written for publication. But a good one-third of it was not. That section of the book, like *Letters from a Flying Officer,* is composed of messages written home by the author. And here the book is more interesting than ever for the writing is natural and the author was able to tell of day-by-day happenings without having to call upon his memory, diary, or just sketchy notes.

"En l'air!" (In the Air), by Lieut. Bert Hall, $1.75.

If there was ever a legendary pilot of both war and peace, Bert Hall really deserves the title. He has probably done as much fighting, seen as much death, and covered as much territory as any military pilot in the world. This book tells of three years of his World War experiences above three fronts.

There are many photographs in this volume showing actual air combat and planes being shot down. But probably the most interesting part of the whole book is the chapter entitled "My Methods of Attack." This explains why and how Bert Hall lasted out the war and became one of the most famous of aces.

Falcons of France, by Charles Nordhoff and James Norman Hall, $2.00.

Here is a novel which relates some of the most vivid experiences that ever befell youth; it is a good historical account of the Lafayette Flying Corps by two of its noted members.

There is no need for fiction here, for Falcons of France tells with extraordinary accuracy the fascinating story of a hard-working pursuit squadron at the front.

I'm wrong. Did von Igel fly the SO3C-1 back here?"

"Yeah, but what's that got—"

"What about the Vought and Temple's ship?"

"They left them at the Barton plant," answered Doyle.

"Then everything's all right. Remember that special alarm I told them to broadcast for the SO3C-1? By morning, Civil Aeronautics and Navy will have pilots checking fields from coast to coast. They'll probably get the Air Forces to help, too. That ship will be the hottest thing this side of Tokio."

"Say, you've got something there," erupted Doyle. "When they find the ship, it won't take long to hook up that fake flyin' service with this nuthouse. They'll raid th' joint and we'll be out in no time."

"Sure," said Knight. He looked up at the light fixture, rubbed the bump on his head. "All we have to do is sit tight and wait."

It was less than five minutes when the bars of the padded door grated. The door swung open and light from the hall slanted in. As Knight closed his eyes he heard *Leutnant* Skalb's voice.

"Bring the two Americans. *Der Englander* stays here."

With his arms gripped tightly, Knight was hustled out of the padded cell. His captors marched him straight ahead for a few moments, then up a flight of stairs. He heard a door open, and his guards pushed him into a room and halted. He heard Doyle brought in, and then the door closed.

CHAPTER IV

Death Sentence

"HERE THEY ARE, *Herr* Baron," said Skalb. "But I don't see why we don't get rid of the Englishman, too."

"Because as air attache, he knows British war plans, and I mean to get their secrets out of him." Von Igel's rasping voice changed to a note of mockery. "Mr. Knight, I am indebted to you. I refer to the information about the search-order for the SO3C-1. You see, there is a dictaphone hidden in that cell."

Doyle groaned and von Igel laughed harshly.

"You spoke your own death sentence when you told me that, Mr. Knight. I had intended you two to have a more drawn-out finish, but this will do as well."

He gave an order and Knight was taken outside. They emerged at the rear of the sanitarium, a big, rambling stone structure set in a grove of trees. Knight saw a high stone wall, against which was built a garage. The sky was still dark—he estimated the time as about three-thirty—and he could see everything quite clearly.

His captors were two black-garbed Nazis, minus their hoods. In a moment two other Nazis came out with Doyle. Von Igel and Skalb brought up the rear. A sleepy young German backed a large delivery truck out of the garage, opened the rear door. Knight and Doyle were shoved inside and the four guards followed. Von Igel and Skalb climbed in, and sat on the bench across from the two captives.

Knight had a brief glimpse of the interior before an overhead light was switched on. There were two long benches, evidently for carrying the Nazis back and forth to the field without attracting attention. Up at the front was a double-barreled tank and a swiveled blow-torch bolted to a wheelbarrow frame for quick transportation. It was plainly by units such as this that the Nazi saboteurs had been able to create such havoc at the Barton plant.

The truck got underway and Knight heard the driver tell someone to open a gate. Then the machine rolled onto the highway and picked up speed. He remembered the turn, and when the truck stopped again he knew they had come less than a mile from the sanitarium.

The light went out and von Igel opened the door. As Knight climbed down, the guards holding his arms, he saw several Nazis near a shack adjoining the hangar. They were in various states of dress and their faces were sullen. One, a big German, the surliest of the lot, came up to the truck and confronted von Igel.

"*Herr* Baron, this is not Germany. I can't be responsible for my men if we keep on working them like this."

Von Igel's swarthy face flushed. "This is an emergency, Sergeant Wessen."

"We're spies—criminals under *Amerikanisch* law," Wessen said bluntly. "When we were all prisoners in Canada, you told us about this scheme, but you said we would make only one raid a week. Here, the first night, we go out three times and risk our necks."

"We're protecting ourselves from being trapped," the Nazi ace said impatiently. "One of these prisoners caused a search for this Navy plane to be ordered. By tomorrow, every American air agency as well as the police will be hunting for it—and for these men."

A mutter of dismay went around the group. Von Igel cut it short.

"Don't fear, we're getting rid of them and the plane at once. Sergeant Wessen, have the prisoners fitted with parachutes—the ordinary white ones."

"*Mein Gott*, you're not letting them go free?" cried Wessen.

"Certainly not. They will be flown to a point well away from here, and then dumped through the bomb hatch of the Condor. But before you drop them, knock them on the head."

"Why not shoot them?" asked Wessen.

"No," snapped von Igel. "I want it to look as though they jumped from the SO3C-1 and were injured in getting out, which will explain their not opening the parachutes."

"*Ya*, I understand now," grinned Wessen. "But what about the plane?"

"I'm piloting it over into New Jersey, to a spot ten miles northeast of Trenton. It's sparsely settled country there, and I can take to my parachute without fear of being trapped when I land. *Leutnant* Skalb will pilot the Condor over the same place, so the bodies will fall near the plane. Hermann will start at once with the truck, to a rendezvous we have arranged, so I will be back here in a few hours."

A CHILL went through Knight as he heard von Igel's matter-of-fact instructions. Escape from the padded cell, which he had hopefully planned when he saw the concealed microphone, was about to boomerang with grim results. He looked at Doyle, but the conversation had been in German and Doyle was still unaware of the fate von Igel had decreed.

The truck swung around, disappeared, and von Igel motioned Skalb aside as a mechanic went to start the SO3C-1. One of the Condor's engines sputtered into life and Wessen gestured for the captives' guards to take them aboard. Knight fought back the desperate impulse to struggle. It could do no good now; it might end in their being tied until the moment for hurtling into space. With their hands free, there was still a tiny hope.

Doyle was first to be pushed up the crude gangway. Knight followed without resistance, stood as though in hopeless despair as a parachute was buckled on. The two engines were revving up, ready for the take-off, when Skalb hurried into the cabin.

"Don't make any lights, Wessen," he barked. "We're going to cross the river at 8,000 feet and glide down to drop them. We don't want anyone reporting having seen another plane beside the Navy one. Understand?"

"*Ja wohl*, yes of course."

The *Leutnant* turned without emotion to Knight and Doyle. "Goodbye, gentlemen. It is too bad you didn't learn sooner that it means death to oppose the Fuehrer."

"Why, you dirty skunk!" raged Doyle. "Someday we'll take him and—"

Wessen yanked him back and Skalb went on up to the pilots' compartment. Knight cast a side glance at a gun rack near the rear of the cabin, but his guards shoved him ahead. The regular seats had been replaced with smaller ones, closer together. In the middle of the cabin was an improvised bomb-bay hatch. Beyond, strapped to one of the seats, was a blow-torch and tank unit, with a metal shield attached to the wheelbarrow frame, to protect the operator. Knight's heart leaped, then he saw the pressure gauges. They registered zero; that meant the tanks were empty.

One of the Nazis gruffly motioned to a seat. Knight sat down across

from Doyle. The guards were behind them, facing forward so they could see any sudden move.

The Condor pivoted, taxied out, and took to the air with a thunderous roar of its engines. Knight dully watched the ground drop away as the ship banked into a climbing turn.

"Dick, what're these squareheads up to?" Doyle's voice came huskily from across the cabin.

Knight hesitated. It would be easier to let Doyle remain ignorant of their doom until the last moment.

"I don't know, Lothario," he answered.

"I can take it," said Doyle. "They're going to polish us off and drop us out, is that it?"

Sergeant Wessen came up from the rear of the cabin, glowered at Doyle.

"What is he saying?" he demanded of Knight.

"What do you care?" Knight said in German. "He'll soon be dead."

Wessen stalked back to his seat. Knight looked at the four armed guards.

"Not much chance for a break," Doyle said steadily, "but it looks like our only chance. What do you say we jump 'em?"

"No, not yet."

"No use kidding ourselves," said Doyle. "This is curtains. Might as well go fighting."

"Wait till they start to open those bomb-bay doors. It'll cut down the odds."

"Okay." Doyle grinned crookedly. "Well, it's been nice knowin' you."

His homely face twitched and he turned away to hide the look. Knight stared fixedly at the floor. In a few minutes they would make their hopeless attempt. The Nazis' blazing guns would cut them down.

HE GAZED out into the darkness. The glow of a large city showed faintly to the right, blurring his vision until he looked away. That would be Philadelphia. They were making an easterly course toward Trenton, across the Delaware.

The clouds swallowed up the ship and they climbed on through to clear air. Over to the north, another plane showed, a mile away. The Condor swerved to come in closer and Knight saw that the other ship was the SO3C-1.

Five minutes passed, and then the Navy ship's running lights suddenly blinked. Apparently Skalb had signaled the Nazi ace. The Condor leveled out, then began a slow power glide. Knight dragged his eyes away from von Igel's ship, knowing the time had come. His desperate glance flicked again to the torch unit. His eyes passed over it, then suddenly jerked back, seeing for the first time an insulated wire that ran from the pressure gauges to the control switch.

Unless the switch was on, the gauges would not register. The tank cylinders were probably loaded, after all.

Knight leaned forward tautly, try-

Aero Book Reviews

Any volume described in this department may be obtained, at the price quoted, direct from the publisher named and at the address given. When writing for a book kindly mention that you saw it reviewed in FLYING ACES.

Service Experience

Air Base, by Booth T. Guyton, Whittlesey House, McGraw-Hill Book Co., 330 E. 42 St., New York City, $2.50.

Here is a thrilling, action-packed story of what goes on at a Naval aviation base. Author Guyton is now the test pilot for Vought-Sikorsky Aircraft, but this book deals almost entirely with his varied experiences in the Navy.

After such a conglomeration of war books recently, *Air Base* certainly is a great and welcome change. If you buy no other aviation book this year, for sheer entertainment we suggest *Air Base*.

Concerning Japan

Volcanic Isle, by Wilfrid Fleisher, Doubleday Doran, Garden City, N.Y., $3.00.

As you might expect from the title, this book is about Japan and the odd course that country's history has taken. And Mr. Fleisher is probably the most competent observer to write about such subjects, for he was many years the editor of the newspaper, *The Japan Advertiser*.

Concerning *Volcanic Isle*, Major George Fielding Eliot says: "For a clear understanding of Japan and her rulers and of the Pacific Ocean problems of the United States, this book is indispensable."

Now that Japan is in the spotlight more than ever because of her war with America, this book plays a big part in explaining the why and how of the Japanese policy.

Aerial Surveying

Northernmost Labrador Mapped from the Air, by Alexander Forber, American Geographical Society, Broadway and 156 St., New York City, $4.00.

Like *Focus on Africa*, this book is definitely not for the average aviation fan. It is a true work of art, a masterpiece in the book field, and would be fully appreciated probably only by those who are interested in more than just flying and thrills in the air.

There are scores and scores of absolutely beautiful photographs. Most of them are of landscapes, but landscapes such as this reviewer has never seen before either in picture or in reality. This book will live long after thousands of present-day ones are forgotten. And the reader who buys it will undoubtedly read it time and time again, with added interest at each reading.

The purchase price also includes six folders of maps and a special *Navigational Notes* booklet.

For Meteorology Students

Weather Analysis and Forecasting, by Sverre Petterssen, McGraw-Hill Book Co., Inc., 330 West 42nd St., New York, N.Y., $5.00.

Unique in scope, this distinctive book presents a complete, authoritative treatment of the modern methods of weather analysis and forecasting. The author discusses in detail the underlying theories and their application to weather charts and upper air charts, and offers numerous examples of correct analysis and forecasts. Investigations in the fields of air-mass analysis, frontal analysis, and isentropic analysis are also included.

Mechanized Warfare

Invasion in the Snow, by John Langdon-Davies, Houghton Mifflin Co., 2 Park St., Boston, Mass, $2.50.

Author of *Air Raid*, of 1938, Langdon-Davies is well qualified to write on the subject of mechanized warfare. He spent some time at the front studying military tactics during the Spanish War, and when the Russo-Finnish War broke out he again left for the front to continue his studies.

Invasion in the Snow is an analytical study of the Finnish method of warfare, telling how the soldiers of that country fought the soldiers of Stalin from the south. For a good story of modern mechanized warfare, its history and development to its present effectiveness, we suggest that you read *Invasion in the Snow*.

For Service Men

Simple Aerodynamics and the Airplane, by C. C. Carter, Ronald Press Company, 15 East 26th St., New York, N.Y., $4.50.

This is the fifth edition of the book bearing this title. This revision, based on eighteen years' experience in teaching the subject of aerodynamics is considered satisfactory for a short course for cadets who are soon to be appointed 2nd lieutenants in the Air Forces. The presentation is not highly technical. Sound fundamental principles have been developed and applied and sufficient descriptive matter added to equip the cadet in such elements of this subject as may be helpful to him in his professional work.

(*Also see pages 74 and 78 for other reviews*)

ing to signal Doyle. Before he could catch his attention, Wessen's surly voice came from amidships.

"Rueller! You and Thomson bring the tall man."

Knight got to his feet. Wessen was already opening the bomb-bay doors. The moan of the ship's wings came up eerily as the doors slid back. Doyle started to jump up. Knight pushed him back.

"Goodbye, old man," he said loudly. Then, in a swift aside, he added: "Flop back of that shield when I yell."

"Come! *Mach Schnell!*" snapped Wessen. One of the Nazis stepped toward Knight, gun half-lifted.

"I'll go alone!" Knight said coldly. He turned as though for a farewell gesture to Doyle, then with a shout he plunged back of the torch-operator's shield.

Doyle dived to the floor, behind it, just as two shots blazed. A bullet ricochetted from the shield, hit the top of the cabin. Knight spun the control valve and slammed the main switch closed.

A jet of blue-white flame shot from the tip of the torch. Screams rose above the hiss of the flame, as Knight blindly whipped the torch through on arc.

"I've got it, Dick!" shouted Doyle. Knight jumped back as he felt Doyle snatch the handle. There was another frightful cry, almost instantly drowned by a torto shriek of agony from Wessen. One more shot clanged against the metal shield, then abruptly the hissing died.

Knight flung a hasty look around the barrier as his vision returned. Wessen and Rueller were dying; the inferno of the torch had caught them both. Thomson and one of Doyle's guards had vanished. The fifth Nazi was frantically trying to pull a Tommy gun from the rack in the rear.

Knight scooped up a pistol from Rueller's limp hand. A swift shot dropped the guard in his tracks.

"Get that Tommy gun, Lothario!" he called to Doyle.

"Look out—back of you!" bawled Doyle.

Knight ducked. A gun blasted from the cockpit doorway, and he saw Skalb's mechanic hastily take aim again. Two bullets roared from Knight's pistol. The mechanic fell, drilled through the heart.

As Knight reached the cockpit he saw Skalb drop a radio mike and claw for the gun at his hip. Knight whirled his pistol down at the German's head. The butt hit squarely, and Skalb sagged in his seat.

Knight dragged him off the controls and dumped him on the cockpit floor. As he took the controls, something flickered off to the left of the Condor.

It was the flash of the Navy ship's tracers as von Igel warmed the guns. Skalb had managed to warn him, and the Nazi ace now means to down the Condor regardless of Skalb and the rest!

"Lothario! Port side—von Igel!" Knight shouted back into the cabin. He heard glass shatter as Doyle rammed the Tommy gun through a window.

The Curtiss Scout whipped around and its wing-lights flashed on. Half-blinded, Knight fought to see as the Nazi ace charged in. With a lunge at the wheel, he hauled the Condor into a violent zoom and switched on the powerful landing-lights.

THE CONDOR lurched dizzily out of the zoom, and above the howl of its wings he heard the clatter of Doyle's Tommy gun. By feel alone, he leveled off and waited. It seemed an age until he felt Doyle slide into the cockpit beside him.

"Holy catfish!" breathed Doyle. "He missed us by less than ten feet! You must've blinded him."

"Then you got him?" Knight said, unbelieving.

"He flew right into my sights. The ship burned; it was the damndest thing you ever saw."

"Wessen and Rueller?" Knight asked.

"They're dead. This guy Skalb's the only one who lived through it."

"What happened to the others?"

"They tried to jump clear when you cut loose with the torch, but they didn't make it. They fell through the bomb-bay."

"Take over, and head for Philly," Knight said after a few moments. "We'll get a police and F.B.I. cordon around that asylum and the field before they know what's happened. Poor old Temple; he's probably given himself up for lost."

Doyle banked the Condor, then he looked down at the unconscious Skalb. "What a jolt he's going to get when he wakes up and finds himself behind bars! And speaking of bars, I could do with something liquid right now."

Knight's face lost its grimness. "I'm afraid those days are over for you, Lothario. No more brawls, no more chasing blondes—"

"Huh? Why not?" demanded Doyle.

"You just shot down Germany's ace of aces. You'll be a famous hero. You'll have to uphold the dignity of—"

"Nuts to that," interrupted Doyle. "I'll take th' dames. Anyway, whoever heard of a hero with a mug like mine?"

THE END

GLOSTER SOLID

(Continued from page 53)

they may be partially inserted into the wings and cemented. Check your rigging details with those on the plans. Be sure the struts line up correctly. Cement the rudder and elevator parts in place. After all the cemented parts are dry, remove the pins and with a razor work away the excess cement particles. Apply several coats of clear dope over the entire model and sand lightly between each coat. Before applying the dope, however, it is best to brush the entire model with two coats of wood filler.

The correct color scheme for the Gloster Gauntlet is as follows: All surfaces in bright aluminum including the wing, center section struts, landing gear legs, and wheel pants. Tires black. Motor details black. Regulation red, white, and blue insignia on the top of the upper wings and on the underside of the lower wings, as well as on both sides of the fuselage. The vertical fin sports an oblong arrangement of the tri-color. Red is nearest the leading edge of the fin. All hinge lines should be marked off in black India ink. The checkered square on each side of the body near the bull's-eye insignia may be a combination of any two contrasting colors. This is in reality a squadron marking. Landing and flying wires are rigged with care as shown. Use strong gray or white thread for this purpose. Lastly, celluloid is formed to shape the windshield.

THE END

CLUB NEWS

(Continued from page 41)

Furthermore, the little critter is built entirely of framework all except the nose block! It is covered with superfine tissue. The wheels roll and the prop spins. The guy wires are made of copper wire—finer than human hair! The nearest thing to the size of his model, Leonard believes, is a model having a 2¼ inch span which was exhibited at the late New York World's Fair. Leonard's workmanship certainly deserves some sort of consideration and it's too bad that the model wasn't built from plans appearing in F.A., so that he could have entered it in the D.S.M. contest. According to our Model Editor who tells us that the Fokker D-7 three view layouts will soon be published in the Wartime Three View Section, Leonard could have waited a few months and really fooled us with this photo as a D.S.M. entry. But Leonard is an honest chap. Yes Sir!

A lot of you steady readers have heard of Claude McCullough. Well, there he be in the photo looking over his little Atom powered model. Claude, who hails from the state where they grow them big pertaters (Iowa, to you, and you, and you) is an outstanding model builder and designer. When it comes to placing in big time contests around the western part of this country, look for Claude's name on the top of the list. Claude, too, is an old time member of the F.A.C., having joined up with us almost at the time we got this Club organized.

Don Fuqua, of Fairfield, Iowa, threatens to relieve us of a citation bar with another D.S.M. entry. Okay, send her in. He already won that medal sometime back. Aside to Vincent Doa: The model in your photos looks fine. Why don't you try getting better shots of the craft alone so we

can consider it for a citation bar?

Eddie Lapides, of 41 Wildwood Street, Dorchester, Mass., suggests that we include sketches of airplanes throughout the pages of the magazine. He is more interested in details of construction than just ordinary model building plans. Well, Eddie, in one of the next few issues you'll have your wish. We have just secured an excellent cut-away drawing of the Hawker Hurricane, drawn by that master draftsman, J. B. Rust. Watch for it.

Joe Bair, of 4078 Elmwood Avenue, South Euclid, Ohio, writes and wants to know if he can use parts of this column to include in the aviation column of his school newspaper.

It's okay with us, Joe. Go right ahead and "lift" whatever you think you can use. Send us a copy of your paper. Fair exchange?

Well, fellows, time to close shop. See you next trip. THE END

PROFILE FLYER

(Continued from page 57)

Use hard balsa for the leading, trailing and center spars as well as the ribs, too. Dihedral begins outward of the center section panel. Crack the wings slightly at these joints and raise the extreme tips to the required angle. Apply cement at the cracks and then place a weighted object on the center section panel. Place a "prop" block at the tip of the wing and allow to dry in this position until the cement hardens.

The stabilizer and rudder are made of simple frame construction. Leading and trailing edge of the horizontal stabilizer and rudder are made from 1/16" square balsa. The curved tips of the tail parts are shaped from 1/16" sheet. Keep these surfaces perfectly flat while the cement dries so that there will be no tendency for the parts to warp out of shape.

COVERING, ASSEMBLY AND FLYING

ALL FRAME PARTS are covered with yellow tissue paper. Banana oil is used for the adhesive. Trim the excess material carefully and tuck in the rounded edges neatly. All the covered parts should be given a water spray and set aside to dry in normal temperature. Do not place these parts near a heated radiator or they'll warp like a propeller set for high pitch.

In assembling, first mount the horizontal stabilizer. To do this, a slot must be cut out of the tail end of the body to accommodate this surface. Apply cement at all joining edges and set the stabilizer in position. Immediately afterwards, cement the rudder in position. Check for alignment. While these parts are drying cut a small slit in the paper covered wings alongside the rib where the landing gear leg is to be cemented. Apply a generous coat of cement to the side of the leg and along the front part of the rib and insert the leg. Do both parts at the same time so that small model making pins may be inserted into the cemented areas to aid in holding the landing gear legs upright. Attach the bamboo brace as shown. Later the pins should be removed.

When dry, attach your propeller with hardwood nose plug in place and rubber strands ready. The "glass house" outlines should be drawn with a hard pencil point and then filled in with dark ink outlines before attaching the wings and tail.

The wing panels are cemented to the fuselage in the position shown on the fuselage drawing. Use the cement generously and insert small model pins. Allow the model to stand on its own "legs" and if a bit wobbly place "props" on either side to prevent swaying.

Regulation stars and stripes are cemented in place as shown. U. S. Army may be set in position on the underside of the wings in the usual manner. Test glide your model and adjust the rudder and elevators to obtain maximum gliding distances. Fully wound, the model really turns in some spectacular flying and soars about gracefully.

In the event weight in the nose is required it may be had by applying, with cement, ordinary silver wrapper as found in tobacco packages. Smooth out pieces before applying.

THE END

AMERICAN ACES

(Continued from page 11)

with an attack that put the big ship out of action.

While this is not as dramatic as the role played by Captain Kelly, it shows that once an American military pilot "gets his teeth" set, he holds on like a bulldog and all hell won't shake him loose. It was reported that the battleship was subsequently sent to the bottom to join the *Haruna*.

Lieut. H. T. Utter

Lieutenant Utter won the commendation of Admiral Hart for attacking three Japanese fighters at sea. He destroyed one, but his plane was so damaged in the fight that he was forced down after dispersing the remaining two enemy planes. Still, however, he was able to taxi his Naval plane to shore where repairs were made. The next morning he returned to his base without further incident.

Lieut. Joseph H. Moore

Under a heavy machine gun fire of Japanese planes, First Lieutenant Moore led his group of American pilots to their grounded ships. Roaring aloft, they got four enemy planes. One of the American planes was hit and its pilot had to bail out. Moore, his guns blazing, drove into the center of five Japanese planes attacking his falling comrade. He shot down two and distracted the others. Both the parachutist and Lieutenant Moore landed safely.

Lieut. Carl Gies

Aloft to protect his home field against anticipated attack, Lieutenant Gies got radio notice that another American base twenty miles away was under assault. Rushing there, he dived into a group of twenty Japanese planes, forcing down one. He returned safely to his scarred ship.

Lieut. Randolph D. Peater

The first American pilot to down a Japanese plane over the Philippines, Lieutenant Peater, got on the tail of a whole group of enemy ships, shot down one and joined in a general dogfight in which two more Japanese crashed. On the way home, his gasoline and ammunition running very low, he pursued another Japanese machine and saw it fall in flames.

Lieut. Kenneth M. Taylor

This pilot was the only other Army flyer with Lieutenant Welch during the attack on Japanese dive-bombers on December 7. He accounted for two enemy aircraft, but details at this writing are lacking.

Lieutenant Taylor was also presented with the Distinguished Service Cross for his gallantry in action.

Lieut. Samuel H. Merett

Leading his squadron against Japanese naval transports trying to land troops on Luzon, Lieutenant Merett and his companions set two enemy vessels aflame and then, in a last dive, Lieutenant Merett flew his plane squarely into the side of a third Japanese transport, blowing it up.

Lieut. Jack D. Dale

Repeatedly attacking a group of Japanese transports, he first silenced and then smashed their anti-aircraft guns and swept down upon enemy landing barges to cause heavy casualties. He returned from the action without injury. THE END

MODEL NEWS

(Continued from page 52)

"Upon recommendation of Dr. Edwin W. Adams, associate superintendent in charge of higher schools, Victor R. Fritz, instructor in the mechanic arts department of Olney High School, has been named to organize the program and direct it in its initial phase.

"Mr. Fritz has been in Philadelphia public school system since 1935. In addition to his teaching duties, he is an experienced sportsman pilot and a pioneer model airplane builder. He is president of the Aero Club of Pennsylvania, and has been field director of the Philadelphia Model Aeroplane Association since its inception twelve

years ago. He is also identified with model airplane activity nationally, being an official of the AMA and a judge at several national model contests."

Dr. Stoddard's announcement continued: "Tentative plans call for, first, the enlistment of key teachers to act as sponsors for club groups in each of the twenty-five junior high schools in the sixteen high schools. For teachers who are interested, but who may be unfamiliar with the more technical phases of model building, there will be a special training program set up.

"Additional programs will be held in which instructors more familiar with model building will participate in discussions devoted to the latest materials and developments in the field of model aeronautics.

"In the junior high schools, the program will be worked into the existing club activities program, held in school time on a selective basis. A number of junior high schools now have model airplane clubs, but the increased attention given this subject will make it possible for many more pupils to take part. The program will be made attractive to girls as well as boys.

"For the present, the project in the senior high schools will be one of extra-curricular activity, the clubs meeting after school hours.

"Organized pupil activity in most of the schools will be preceded by special school assembly programs at which Mr. Fritz, assisted by pupils who have had some experience in building and flying their own models, will give demonstrations of the various types of model aircraft.

"His duties will also include visits with the school clubs to give instructions and guidance in model construction and any problem that may arise. Successful model airplane programs, it may well be pointed out, can be conducted without expensive or elaborate equipment.

"Besides its value as a hobby and its potential value as vocational preparation in a field which has ever-widening opportunities and possibilities, the project will be useful in correlation with regular school subjects. With the cooperation of teachers of such subjects as mathematics, physics, social studies, drafting, and the various shop work, abstract principles may be given life and vitality for many pupils."

AYA Directors Named

Area Directors who will represent Air Youth in various sections of the country have been appointed by the AYA National Council, it is announced by Ernest Gamache, director.

"In recognition of the oustanding service to junior aviation and the development of model airplane building and flying that has been made by the senior leaders in the field, Air Youth is seeking to establish a closer relationship with these leaders, in order to benefit from their experience and advice," Gamache said in making the announcement.

Area Directors have been appointed in seven states where the Air Youth program is now most actively under way. Additional directors will be appointed in other sections, as the need arises, it was explained.

"The Air Youth program is now rapidly expanding. Questions every day come into National Headquartes from clubs, schools, and leaders and from the boys and girls themselves, which cannot be satisfactorily answered by correspondence. There should be somebody in the area who can act as a representative for Air Youth. We have been particularly fortunate in the men who have undertaken to serve with Air Youth; we know that our usefulness and service will be greatly increased by reason of their willingness to give us help and suggestions," Gamache said.

The first group of Air Youth Area Directors includes the following. Other names will be announced shortly.

Southern Texas, Edward Burgdorf, Houston, Texas; Wisconsin State, Eugene Coles, Milwaukee, Wisconsin; Upstate New York, Harry C. Copeland, Syracuse, New York; Michigan State, Stephen Corbett, Detroit, Michigan; Kansas State, Leo Rutledge, Wichita, Kansas; Missouri State, Robert H. Sommers, St. Louis, Mo.; Western Pennsylvania, M. J. Thomas, Pittsburgh, Pa.

Gulls Have Active Season

The Cream City Gulls attended eleven meets last season and won six firsts, six seconds, and five third places. Besides all this activity the Gulls had a booth at the *Milwaukee Sentinel* Sports Show, April 26 to May 4. Over 110,000 persons attended and many new members were gained. Then the Milwaukee Festival started July 12 and ran till July 20, and the Gulls had a working booth with twenty-three modelers, working to finish models that were given them free. Motors were given for the best finished models. Arthur Magnus, Jr., 12 years old, won first prize with the best finished ship.

On Oct. 5 the Gulls held their first meet. A $225.00 prize list was offered and Gene Haupt ran off with nearly all the prizes, an $80.00 course in aircraft welding and an Ohlsson 60 for total high time and the longest flight of the day.

EXPERIENCES

(Continued from page 37)

watched say he stalled all right, but every time he kicked the rudder to get a spin started the ship refused to gyrate. He tried to spin about a half-dozen times, then gave up and landed. "She's a fine ship, Joe," was his report, "but for heaven's sake don't ever try to spin her. She'll never come out, and I'm not kidding."

That report bothered Joe for a few days. Then he took-off one day and

climbed to four thousand. He leveled off and idled the motor. Glancing over the side of the open cockpit he was satisfied with the ground being far below; from what he had seen it would be quite a job getting the spin started. He cuddled up close to the very special and very large new windshield they had built on his ship—and went to work.

The start of the spin was not very difficult, and Joe let her make several turns. According to his instruction and the method by which he and others have brought ships out of spins, he eased forward on the stick and forced on opposite rudder. A thousand feet had been lost, and Joe's efforts did not bring that spin to any change.

He tried again, with easy movements of the controls, but the nose stayed down and the tail kept whipping around. Joe felt for his chute. Okay. He unbuckled the safety belt, stood up on the seat, and—

The tail changed its tempo, so Joe slipped back into the cockpit and jammed on opposite controls. . . . And the ship went right on spinning!

It was no time to fool around; things were taking on easily recognizable shapes. Again Joe stood up in the cockpit and again it seemed to affect the spin. This time he stretched his leg (he's a very short man, incidentally) and coaxed the rudder, while his hand tucked the stick under the board. There was only 800 feet to go. The ship responded easily to the controls this time, and Joe landed her in his standing position.

When he told with some reluctance about his difficulties the first impression was that his weight changed the center of gravity and that it was this that brought the ship under control. But a closer inspection uncovered the new windshield as the culprit; its shape and large size had blanketed out the rudder. When Joe stood up in the cockpit he broke that vacuum and even the disturbed stream of air was sufficient to bring the rudder into play.

That special windshield, of course, was chopped down to the barest necessity.

But, even as Joe Alta himself would say today, that was all a long time ago. At the present there is the routine of hard work, teaching others to fly planes and qualify for their respective licenses.

I asked him if his intention was to continue teaching.

"I get along with girls and fellows," was his answer, "and so far I've had no complaints on my teaching ability. But I am thinking of the job as Flight Supervisor for the CAA."

The subject then got around to the Government and City, in which they take over improved and developed airports. "What about Queens County Airport?" I asked. "I hear the City wants to take it over."

"Yes, I know about it."

That was all Joe said. It seems every private and commercial owner and operator is aware of the condition and fact that at any time the notice might be posted for them to leave and hunt for another field.

But until they have to leave—and Queens County Airport is still operating full blast—the boys haul away with everything they've got. It's the American way of doing things.

THE END

HOT FRANCS!

(Continued from page 35)

Le-Duc. The rat jumped right at him and he saw that its face resembled that of one Lieutenant Pinkham. The Frenchman went into a tantrum when he tumbled to the evident hoax. He thought of the torture he had endured under the needle of one Jacques LeFarge, and he thought of ten thousand francs.

"Sacre! Mon Dieu!" Burbonne yelped. "I weel personal cut hees thro't. He mak's me theenk I have ze good chance to be ze Bourbon an' get ze meelyan dollair. So I weel not risk eet getting keeled by ze Boche. I weel keel heem!"

Phineas, in his hut, was reading the book about French criminals. He read the chapter again that had given him the idea of the tattoo mark. The little red dagger marked a gang of vicious Frog felons that, three years before the war, had looted a car carrying two million dollars in gold to a Paree bank. One had been wiped out in the getaway. There were three left, Athos the Apache, Black Bart Villier, and Louie the Red. The police of seven countries were still on the lookout for the criminals, despite the war. All the great police organizations of Europe were trying to apprehend three hardened criminals who were branded with the little red dagger. The raid on the French armored boiler was the biggest unsolved crime in the history of the French Surete, and that manhunting corporation had sworn to solve the case if it took them a hundred years. The book said that detectives had joined the French army for they believed one or more of the gang had donned the uniform to duck the dragnet.

"Whew," Phineas said. "That is some case. I think I will tear out that chapter as it might come in handy. Why, I even know where there is a Frog branded with the red dagger. So if he gets tough about the trick I played on him, he had better get a good lawyer from Philadelphia. Haw-w-w-w!"

Phineas gathered up a lot of his personal belongings and put them in a musette bag. They were his stock in trade—little odds and ends designed to make life miserable for the gullible of the war-torn world. Major Garrity had told the E.O. that he was going to make a personal raid on the Pinkham Nisson and put an end to the jitters on the drome of the Ninth. The trouble was that the C.O. had not lowered his voice when he had made the threat and Phineas had happened to be passing by outside the window of the Operations Office.

"I'll take them into Barley Duck," Phineas said, "and put them in safe keeping with Babette until I know where Chaumont will dump me. I will hide it in the bushes first."

Brass hats arrived and wanted to know if Garrity did not think his outfit should be washed up and replaced by girl scouts. If he did not think so, it would do him no good because an example was going to be made. The Ninth Pursuit Squadron, they had heard, had deliberately incurred the hostility of the French squadrons in their sector, and they had also heard that Lieutenant Pinkham in some strange way or another had destroyed the morale of a great French ace.

"Nobody can prove it," Phineas said. "Just because he turned from a tiger lily to a shrinkin' violet, I hexed him, huh?"

Phineas went into Bar-Le-Duc, intending to cache his tools of legerdemain and skullduggery with Babette, but he happened to visit an estaminet first. He was a little low in spirits and he stocked up on them. When he awoke in an alley behind the Frog gigglewater bazaar, the roosters were crowing outside of the town.

"What a taste on my tongue!" Phineas gulped. "It is like all the hoboes in Europe walked up and down it all night without shoes on. I forgot myself last night and I am AWOL, too. Well, I must go to see Babette." He emerged from the alley, or tried to, but a hand grabbed him by the nape of the neck and dragged him back again.

"Ah, ze jok', hah?" Lieutenant Jules Burbonne howled. "I land ze Nieuport to get ze dreenk before I go an' fight ze Boche. I hear ze peeg, Pinkham, is in ze town, so I look from here to zere an' ici you are. Now I weel keel you. Bourbon, oui? Ze meelyon dollair! Take zat an' zat—!"

"Yeah?" Phineas said, and remembered a certain ju-jitsu trick he had learned from a Jap butler in Boonetown, Iowa.

Fifteen minutes later, Phineas Pinkham walked out of the alley, but he wore the uniform and flying gear of the Frog Flying Corps. He carried his bag of tricks with him but certain things were missing from it— A little mustache and a black wig. He turned the corner and hurried out of Bar-Le-Duc, heading for a certain flat stretch of land where a plane could land if it had to. He knew he would find the Nieuport there.

"So he found out, huh?" Phineas grinned. "Well, I will get arrested if I go back to the drome. If that Frog gets upstairs again he will knock off a dozen Krauts in a week an' the Ninth will have to pay the ten thousand francs. I might as well not be there when it happens. What a mess I am in! Well, I will go out and

Aero Book Reviews

Any volume described in this department may be obtained, at the price quoted, direct from the publisher named and at the address given. When writing for a book kindly mention that you saw it reviewed in FLYING ACES.

Bargain Hunters, Attention!

Through the Aeronautical Chamber of Commerce a special offer has been made to the readers of FLYING ACES MAGAZINE whereby they may purchase the 1940 and 1941 *Aircraft Year Books* in a combination offer for only $7.00.

These books sell anywhere else for $5.00 apiece and if bought individually through FLYING ACES will cost that amount, too. At a savings of $3.00 the buyer receives two beautiful editions of the most authoritative aeronautical volumes—which cannot be duplicated anywhere else. These volumes contain data concerning America's latest development in the air, manufacturing and engineering progress, aviation chronology, records, flying facts and figures, aeronautical directory and trade index, plus generously illustrated pages of photographs of commercial and military aircraft.

A good-sized portion of these books contain three-view outline drawings of many types of private, commercial, and Army and Navy fighting planes. For the aviation student whose interest lies in either following the progress of American aviation as well as for the aero book collector, these two volumes make your purpose worthwhile.

Cash or money orders for the *combination offer* must be accompanied by twenty cents extra for postage. For one edition add ten cents extra for postage.

For our readers who have not yet taken advantage of the opportunity offered to purchase back copies of other Aircraft Year Books the following is listed for your consideration:

Copies for the 1924, 1926, 1929, 1930 are still available and may be had for 75 cents apiece. Order your copies now while they last. These books are in perfect condition, full of facts, figures, photos, three view drawings, and worth more than five times the amount asked for. Early purchasers express great satisfaction with their copies.

Copies of the 1925, 1932, and 1937 are available in limited quantities and may be purchased as follows: 1925—$4.00; 1932—$4.00; 1937—$3.00. First come first serve. Orders must be accompanied with *ten cents* extra for postage *per book*. This is important!

All money orders, checks, and well wrapped cash orders should be addressed to Jesse Davidson, FLYING ACES MAGAZINE, 67 West 44th St., New York, N.Y.

Note: All orders received after this issue appears on sale will be filled out only if accompanied by the amount mentioned in this announcement. Orders for copies accompanied by amounts quoted in previous announcements will not *be filled out.*

For Aero Stenos

Most Used Aviation Terms, published by the Gregg Publishing Co., New York, Chicago, San Francisco, Boston, $.80.

As one of our most vital industries to our national defense, aviation will need more mechanics, engineers, draftsmen, and last but not least, stenographers. Any young male or female secretary possessing an understanding of aviation terms and who can translate those terms into shorthand notes will, indeed, be a valuable person to any aero organization.

Because of the expansion of the aero industry, demands will soon necessitate employing such persons. And if one wants to be prepared for such a position, here is the book that will help you do it.

Prepared by Harold E. Baughman, author of the *Aero Thesaurus*, this book contains 1,000 terms defined by the Gregg method. Arranged in alphabetical order it is especially valuable to the student who may learn the meaning of the expression as well as practicing the shorthand form. Listing all the phrases and short cuts, it is just the thing to prepare one for an aero stenographer's job.

It Has Everything!

Elements of Aeronautics, by Frances Pope and Arthur S. Otis. Published by The World Book Company, Yonkers, N.Y., $3.40.

Both aviation and educational authorities have recognized the ever-increasing need for basic instruction for young people in this vitally important field. In *Elements of Aeronautics* an experienced educator and transport pilot have collaborated.

This book, 653 pages strong, is divided into five parts: Learning to Fly, Aerodynamics, Avigation, Meteorology, and Aids and Safeguards. Presented under these five headings is a general view of the whole wide field of aviation with its many opportunities for employment and diverse abilities. This book is recommended, for it is one of the few which provides a thorough grounding in the fundamental concepts of aviation.

(*Also see pages* 69 *and* 78 *for other reviews*)

knock off some Heinies before the M.P.'s get me. Let's see, I heard the brass hats say the other night that they was sure the Boche headquarters was near Ars. Hindenberg himself was there. Maybe I can take off one of his sideboards with some tracers. Well, I had fun."

MORE THINGS happened soon after Phineas took-off in the Nieuport that morning. A French gendarme happened to walk into the alley where Lieutenant Burbonne was struggling to get into the clothes Phineas had left behind. Phineas had given the Frenchy a terrible going over and he was a tough looking specimen when the gendarme got a gander at him. His back was turned to the Frog cop and the little red dagger on his shoulder stood out in bold relief. The gendarme nearly fainted, started to remember a lot of things as he dived for Lieutenant Burbonne. Quite a scuffle ensued, but the French aviator had already been tossed about by a Boonetown whirlwind and soon yelped enough.

Lieutenant Burbonne tried to explain in the bastile. His story was too fantastic for words, and the upshot of it was that he was held as a suspect in the robbery of the car carrying two million dollars in gold to a bank in Paree. They tried to make him own up to being one of the three crooks at large. They painted a picture of the guillotine for him before they notified the Frog Scotland Yard of the capture. They accused Burbonne of trying to escape in a United States flyer's uniform and asked him to own up to where he had hid the body. Which all goes to show you what Phineas Pinkham could do to a war.

Just after Phineas left Bar-Le-Duc, he was signalling for a fair catch at Boche real estate above the town of Ars. Three flights of Boche had him hemmed in and they could have made ectoplasm out of him in three shakes of a cat's empennage if they had been in a surly mood on that particular morning. Phineas was sure Hindenberg was down there now. A whole Circus of Krauts would not be circling over their own backyard at such an early hour if he wasn't.

"It is the breaks I git," Phineas growled. "I am cheated of one last fling before I git busted. Without a shot fired, I am captured by the Heinies. It is a disgrace. Awright, stop pointin' at the ground, you squareheads. Where do you think I am planning on lightin'?"

Phineas' Nieuport was surrounded by all kinds of Heinies when he stepped out of it. An *Oberstleutnant* snatched his musette bag and poked inside of it. Then he tossed it back at the pseudo Frenchman and yelped, "Vorwarts! Raus mit!"

"Oui," Phineas grinned. "Say la gare, nest paw?"

They took him into a low cottage thatched with straw where there

were a dozen Heinie officers grouped around a table loaded with maps and photographs and whatnot. A big Teuton with glassy optics and a shaven pate began to fire questions at him.

"I know notheeng," Phineas sniffed. "I was not long in France, M'sewers. Eeet was from ze Foreign Legion I am put in ze army in Frawnce."

"Foreign Legion, ja? Full mit criminals idt ist, hein?" the Kraut officer sneered. "Zo! Short of pilots der French are to let ze soldier from der Legion fly. Dast ist gut! Vait!"

A Boche *unteroffizier* entered and handed the *Oberstleutnant* a big flat oilcloth case. The hairless Kraut took some photographs from it, peered at them for several moments, then banged his fist against the table and bared his fangs. Ach Gut! Pictures of zektor 'K'!"

Phineas' Adam's apple went up and down like an elevator car. His teeth made a loud clicking sound. The Krauts looked at him queerly just as another Prussian crashed the gate and spieled a lot of stuff that was on his mind.

"Ofer by Metzerwiese, *Excellenz!* Der mutiny by der soldiers. *Nein* pay, *nein* vork, dey say. We haff to shoodt maybe half der bummers. *Gott im Himmel!*"

Phineas Pinkham absorbed the words. He kept wracking his brain cells, implored them to produce some ideas. Then one of his little mental Nissons hissed at him.

"Lock up der Frenchman! Later we make him talk or burn der feets."

Lieutenant Pinkham managed to lose something from his pocket before the Boche doughs rushed him out to an old stable and locked him in. As soon as he was in solitary, the Boonetown, Iowa, miracle man plunged both hands into the musette bag. He selected a little vial of red dye and a small pair of scissors from his collection. He cut a piece of paper into the shape of a small dagger, then coated one side of it with the red dye. Next, Phineas stripped to his undershirt. He pressed the dyed side of the paper dagger just behind his right shoulder. It left a specimen of temporary tattooing that was not half bad.

A PRUSSIAN LEUTNANT finally picked up the folded paper Phineas had dropped. He spread it open, saw that it was seven printed pages from a book. Leutnant Schnitzer read a lot of the type and his eyes began to bug out. He hurried upstairs to his superior officer's boudoir, saluted, then handed him the chapter out of the book on French criminals.

"Ja, Excellenz," the Leutnant gushed. "Der Foreign Legion he come out of ycdt. Criminals sometimes hide out in Africa, ja? Der prisoner could be one of der—"

"Shudt up, dumkopf. How can I read vunce?"

The Leutnant waited. He watched the *Oberstleutnant* devour the printed pages, and he could see the man's beefy physiognomy change colors like the epidermis of a chameleon.

"*Ja, Leutnant.* Maybe idt ist one of der criminals. There ist one way we vill prove it. Two million dollars in gold. Ach! Donnervetter, I vas in der German secret polize before der var. I remember der big robbery undt two million in gold! Der Kaiser needs money to carry on der var. Come vunce. Ve will see vhat ist."

Lieutenant Phineas Pinkham was adjusting something to the lapel of his flying coat when the Jerry officers opened the door of the improvised klink.

"Take off der clothes!" the *Oberstleutnant* yelled at Phineas.

"Huh?" Phineas asked, surprised. Then he hid a grin that was trying to ooze out of his face and got up. "I am not hidin' nothin', though." He stripped to the waist and then the *Leutnant* pointed at the dagger on his shoulder.

"Idt ist!"

"Zo! You are a criminal, hein?" the highest ranking officer shot at Phineas. "One of der bummers who stole der gold of der Paris bank?"

"Uh—er—it is a lie," Phineas protested. "I—well, I might as well confess. I am Athos the Apache and I am the only one left. Black Bart an' Louie the Red, they—Haw-w-w-w! Well, I had to rub them out. I says to myself I will be better off with four million than a third of it, *oui.* I buried their bodies in the Seine."

"Four million? Idt was only two—"

"Haw! It was four and they hushed up the full amount to keep a run off the bank, comprenny?" Phineas sniffed and began putting on his shirt.

The Heinies, shocked out of their wits, began to powwow in a corner of the Blink. They stared at Athos the Apache, then went out of the stable. They ordered the guard to be doubled before they hotfooted it to the house with the thatched roof.

Oberstleutnant von Schnarl pledged the *Leutnant* to secrecy for awhile, then went to his quarters. He began struggling with his conscience. Four million dollars in gold. The Kaiser could use it, but not half as much as *Oberstleutnant* von Schnarl. There was that castle on the Rhine that had been confiscated by his debtors just before the Archduke was liquidated at Sarajevo. There was the beautiful actress *Fraulein* Hilda Dietrich, who would marry any German with four million dollars.

Oberstleutnant von Schnarl dueled with St. Nick during the early hours and finally tossed in the towel to the gent with the forked tail. He would make a deal with Athos the Apache.

That night, *Oberstleutnant* von Schnarl visited Phineas Pinkham, alias Athos the Apache.

"Sh-h-h-h-h!" von Schnarl cautioned and sat down. Phineas slid under the seat of his pants a map on which he had been working. He had found the old yellowed paper in the stable earlier in the day, and it had suggested a tidy bit of additional skullduggery.

"You are the only one left, *mein freund?*" the Heinie said. "You know where der gold ist hidden? If I expose you, you vill die by der guillotine in France as soon as der var is ofer. You haff der map where ist der money?"

"*Oui,*" Phineas whispered back. "We drove ze car wiz ze gold away as it was too heavy to carry—I mean, ze argent. We fin' ze cave in ze woods not far from Paree and drive ze car in. Zen we fill up ze entrance to ze cave an' make ze getaway. We say we come back in four or five years when ze cops get tired of ze chase, maybe. Comprenny?"

"I vill make der bargain, *mein freund.* We split der gold two ways, *ja?* You giff me der map an' I give you der chance to egscape. Two other high offiziers know you are one of der criminals undt der vant to send you to der prison undt get der revard."

"It is ze deal," Phineas said. "Only I want one more thing. You get ze maps of sector 'K' as I still love la belle Frawnce even though I robbed her. My poor mother an' father live in ze sector an' might get hit by ze bombs an' shells, nest paw? I am still ze patriot as I cannot help loving a country where you can steal two—I mean four million dollars. Otherwise I will take ze guillotine, *mon ami.*"

"Where ist der map?"

"I got it where it is safe," Phineas said. "You fill your part of ze bargain an' I will do mine."

"*Ja.* I am sick of der var," von Schnarl whispered. "Vhen idt ist ofer, I am der pauper anyway. I vill get der two-seater Junkers undt you vill fly to France in der night. Somevhere behind der lines ve vill be peasants undil der var is ofer."

"It is a deal," Athos the Apache said. "You bring ze photos of sector 'K' an I will have ze map. We will have to remove ze gold slow. A little at ze time, *Herr* pal."

Oberstleutnant von Schnarl went back to his cubicle. He schemed and schemed. Yes, he'd take the photographs with him. He would be in the Junkers' office, behind Athos the Apache, with a Luger. Just as soon as the plane landed— Then there was the *Leutnant.* He would take care of him, too. The *Leutnant* would accompany von Schnarl to the stable to see Athos the Apache. Athos would return in the *Leutnant's* uniform with von Schnarl and the *Leutnant* would become the prisoner. *Oberstleutnant* von Schnarl would knock off Athos the Apache when they reached their destination. He would get the map

where the treasure was hidden and then he would turn over the photographs of sector "K" to the French to prove that a certain peasant was loyal. He would say he found the photos and that they must have fallen out of a Boche Gotha.

THE SCHEME went through as planned. At one o'clock in the morning, the *Leutnant* was trussed up and stowed away in a corner of the klink. Phineas, after showing the *oberstleutnant* the old map, took the photos of sector "K" and put them in his pocket. *Oberstleutnant* von Schnarl told officers who were aboard that he was going to be flown to Saarbrucken at once. He had a terrible pain in his fuselage.

The Junkers was warming up. Phineas, clad in a Boche flying outfit, got into the business office of the two-seater and marveled at his own genius. The *oberstleutnant* got into the rear pit and slid his right hand close to his Luger. Boche ackemmas yelped *kontakt* and Phineas waved his right hand and switched on. He got the power plant howling, then fed it plenty of gas. The Junkers lifted its tail like a cat that has backed into a thistle, and roared away from Ars.

The Junkers got across the lines, flying at a high altitude, but did not head for French real estate until it was over Nemours, a little hamlet south of Fontainbleau which in turn was about fifty miles south of Paris. The *oberstleutnant* prepared for his *coup d'etat*. He got the Luger in the clear and slid the muzzle of it close to the Pinkham skull. He put his head over the pilot's shoulder and gave him orders: "Land near a voods an' we burn der plane, *ya?*"

"Oui, mon ami," said Phineas, and his own left hand began to slide inside his flying coat.

"Ach!" von Schnarl gloated to himself. "I shoodt der bummer vhen he stops der Junkers. Den I take der map an' set fire to der Junkers. I run into der voods undt change into der peasant's clothes. *Ach,* four million in gold! Idt ist *mein tag!"*

Phineas got the two-seater down and taxied toward the edge of a forest. Just as it stopped, he squeezed a bulb, and out of a little tube that had been inserted through the slot in the lapel of his flying coat came a stream of fluid that had been manufactured for the sole purpose of taking gravy stains out of neckties. It caught von Schnarl in the optics and he let out a yell and dropped the Luger. Phineas got up in his office, spun around, and got his big hands on the Heinie's throat.

"Haw-w-w-w-w," Phineas roared. "You should know I get nervous when anybody looks over my shoulder. So you was double-crossin' me, *hein?* Well, I never was Athos the Apache, you squarehead, an' don't know where they hid the gold. I am Lieutenant Phineas Pinkham of the U.S. Air Force. I got a wig and a false mustache on. You hear me, Fritzy, or am I choking you too much?"

"Gott! Aw-w-w-w-wk! Ping-ham?"

Phineas dragged his man off the Junkers and set up a terrible oral sound that carried almost to the fighting lines. In less than a half hour, four automobiles, seven motorcycles with bathtubs attached, three hundred Yank troops, and forty peasants armed with pitchforks and hoes surrounded the Boche two-seater.

"I have here a Kraut officer called von Schnarl," Phineas said. "I am a U.S. flyer in disguise. Here, I will take off the wig and the trick lip fringe. There. Lieutenant Phineas Pinkham at your service. Stop poking them pitchforks at me. I must get to Chaumont or its equivalent at once as I have saved the Allies again."

THERE had been consternation at Bar-Le-Duc for hours. Lieutenant Jules Burbonne was being cross-examined by members of the French Surete and was getting nowhere convincing the Frog F.B.I. that he was innocent. Phineas was put down as a deserter and everybody was wondering what had become of the Frenchy's Nieuport. It was midnight of the second day of Burbonne's incarceration when the pilots of the Ninth Pursuit Squadron were huddled in the mess, wondering when the axe was going to fall. Garrity, it was being bandied about, was scheduled for Issoudon. Bump Gillis and Howell had an idea they were going to be ferrying crates out of Rommarantin.

"That fathead," Bump groaned. "He caused it all. I wish I knew what he did to that Frog. He'd better not be dead, or that Frenchy will get his dome lopped off by the over-sized razor blade."

"I will save him!" came a sudden call.

The pilots looked toward the door. Phineas Pinkham stood there, grinning. Major Garrity picked up his chair.

"Oh, stop being so nasty," Phineas chided. "Here is the pictures that the Rumplers got. The only four copies made. Who says crime does not pay? Haw-w-w-w-w! Gold turns the heads of everybody, even Krauts. Ask von Schnarl, as he is just outside. Well, we had better go to Barley Duck and see the Frog secret service. I can get Burbonne free if he will agree to make his outfit pay us the ten thousand francs, huh? And look—here is the treasure map. I made it myself. I was Athos the Apache an'—"

They let Burbonne go later in the day. The authorities wanted to lock Phineas up in the Frenchman's place, but the U.S. generals would not stand for it. The French Surete did not overlook any bets. They confiscated the map Phineas had faked and studied it well. Phineas had marked a spot just inside the edge of the forest of St. Gobain, near Paris, with an "X."

"Haw-w-w-w-w-w!" Phineas guffawed when the Frogs had departed. "I bet they will check on it."

Do not ask us to explain the rest of it. Truth is stranger than fiction, and some people are psychic and do

Aero Book Reviews

Any volume described in this department may be obtained, at the price quoted, direct from the publisher named and at the address given. When writing for a book kindly mention that you saw it reviewed in FLYING ACES.

CAB Books for Aero Students

The following Bulletins may be purchased from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C.

BULLETIN No. 5 is the *Flight Instructor's Manual* and is available at 35 cents per copy. This revised bulletin is a handbook and study outline intended solely for flight instructors. Includes such subjects as taught in ground school which are covered by the flight instructor.

BULLETIN No. 22 is a *Digest of Regulations for Pilots.* 5th edition published August 1941 and available for 20 cents.

BULLETIN No. 23 is the *Civil Pilot Training Manual* available for 65 cents. In substance this bulletin covers the text for both private and restricted commercial flight courses. It also covers the preliminary ground course except Air Regulations and Navigation and Meteorology.

BULLETIN NO. 24 *Practical Air Navigation* available at one dollar per copy.

In the CPTC this bulletin supplants the Special Publication 197 issued by the Coast and Geodetic Survey. It covers information on navigation of interest to all pilots.

BULLETIN No. 25 covers *Meteorology for Pilots* and is available at 75 cents per copy. It presents in easy understandable form, the complete meteorological information necessary for all pilots.

BULLETIN No. 26 covers the subject of *Aerodynamics for Pilots.* It is comprehensive in its treatment of the subject and is written with a view of presenting this subject in the simplest possible manner. Available for 30 cents per copy.

BULLETIN No. 27 is the *Pilot's Airplane Manual* which deals with construction and maintenance of aircraft. Written to present such information as a definite value to pilots and differentiated from that of the airplane mechanic.

BULLETIN No. 28 is the *Pilot's Powerplant Manual* and is available for 75 cents per copy. This publication is most comprehensive on the subject of aircraft engines and accessorics, and it is presented in a simple understandable manner.

BULLETIN No. 29 is the *Pilots' Radio Manual* and may be purchased for 25 cents per copy. This book deals with information of interest and value to pilots on the use of aircraft radio and aeronautical radio procedures.

BULLETIN No. 30 is a *Ground Instructor's Manual* designed especially for ground school instructors and presents all the information necessary on the subject plus an outline for instruction in such schools. May be purchased for 15 cents per copy.

BULLETINS No. 26, 27, 28, and 29 were prepared for use in the *advanced courses* of the Civilian Pilot Training Program.

Rules require that cash (at sender's risk) money orders or certified check be sent in payment of bulletins listed above. No postage stamps, foreign money orders or smooth coins accepted.

Two Technical Books

Aeroplane Hydraulic Equipment and *Aeroplane Starters and Generators,* Chemical Publishing Co., Inc., Brooklyn, N.Y., each $2.50.

The first book deals with the important proprietary makes much as Lockheed and Dowty used on the best known types of military and civil aircraft. In addition, a description is given of hydraulic equipment of the English Airspeed Oxford and the North American 16-3. This edition is purely for the airplane mechanic.

Aeroplane Starters deals with the operation and maintenance of, for the most part, various British aircraft engine and mechanical equipment. These books are in reality American reprints of British aircraft mechanics' books. Lots of good information for the all around airplane mechanic.

How They Work

The Airplane and Its Engine, by C. H. Chatfield, C. F. Taylor, and Shatswell Ober, McGraw-Hill Book Company, 330 West 42nd St., New York, N.Y.

The fourth edition of this book includes discussions of the major advances in the airplane and its power plant. New illustrations are used for practically all the typical airplanes and engines and descriptive matter which accompanies them has been revised accordingly. New American liquid-cooled, air-cooled and light plane engines developed since 1936 are described together with the most important new engines developed abroad. Propeller data on both electrically and hydromatic operated types are also discussed as well as blind flying and stratosphere progress.

For students earning their airplane and engine mechanics ratings, this book will prove useful.

(*Also see pages 69 and 74 for other reviews*)

not know it. The French detectives finally found the stolen gold just fifty yards from the spot marked on the Pinkham map. Two days afterward they came to arrest both Lieutenant Burbonne and Phineas Pinkham. Both of them proved that they could not have been in France when the robbery took place, and the French Surete turned into a booby hatch for many weeks afterward. Phineas doubted his own sanity, and the pilots of the Ninth Pursuit Squadron doubted Phineas.

"He might have done it," Bump Gillis declared. "There's nothing he couldn't be found guilty of."

"I can't figure myself out," Phineas admitted. "Even I am stumped this time!"

THE END

AIR BOOKS

(*Continued from page 23*)

ject to prior sale." Boiled down, this means, "get your order in ahead of the other fellow." When you have the opportunity to acquire something you want very much, don't hesitate to use airmail.

Whether you decide to collect only World War, pre-war, or whatever field appeals to you most, you will find that specialization will be to your advantage. If you try to spread out and cover the entire list of aeronautica, you'll wind up with a good deal of unrelated material and, frankly, quite a bit of junk. Remember that books in the out of print category are considerably more expensive than books still in print. The price of a book, especially if O-P, depends on its condition, scarcity, and demand. Remember as well that many of these books are rapidly disappearing from circulation, passing into private libraries, institutions, and an increasing number of collectors who are anxious to add them to their shelves. These volumes are now of historic interest and are increasing in value with the passage of time. Remember that the scarce books of today will be the rarities of tomorrow. Carefully purchased items bought now can increase in value and will definitely do so. This should give pleasant reassurance to the collector who invests a considerable amount of his spare money in his hobby.

Whether or not you are concerned with the ultimate value of your library, you'll scarcely regret the time and effort you have spent in amassing your collection. You will have put in many hours of good solid fun in getting your treasure together and you'll always have hours of instructive pleasure ahead of you. Can you ask more of any hobby?

With a final word, I offer a suggested list of titles well worth your effort to obtain for your collection of World War books. They have been chosen with an eye to inexpensiveness, authenticity, and general satisfaction. They are:

Guynemer, Knight of the Air, by

Henri Bordeaux; *Winged Warfare,* by Major William A. Bishop; *Contact,* by Charles Codman; *Heroes of Aviation,* by L. La T. Driggs; *High Adventure,* by James Norman Hall; *Falcons of France,* by Nordhoff and Hall; *Frank Luke, the Balloon Buster,* by N. S. Hall; *En L'Air,* by Lieut. Bert Hall; *Sagittarius Rising,* by Cecil Lewis; *Flying for France,* by Lieut. James McConnell; *The Red Battle Flyer,* by Manfred von Richthofen; *Fighting the Flying Circus,* by Capt. Eddie Rickenbacker; *Letters From a Flying Officer,* by R. S. Wortley; *Warbirds, the Diary of an Unknown Aviator,* Anonymous; *With the French Flying Corps,* by C. D. Winslow.

There are fifteen swell books that will definitely shape your tastes and, I'm sure, whet your appetite for more.

THE END

U. S. AIRPOWER

(Continued from page 5)

essential principle of air strategy, which is the concentration of the maximum force at the decisive time and place.

The single-engine fighter, with its superior maneuverability, appears to hold the edge over other fighter types. It should have every ounce of firepower it can carry without impairing necessary performance. The fighter during the day is more than a match for bombardment airplanes, but before long it must push its ceiling above 40,000 feet—some say 50,000 feet—if it is to maintain this supremacy.

Fighters can prevent the loss of a war, but the heavy bombers are required to win it. The heavy bomber, in which type we lead the world by several laps, remains the backbone of airpower. But since day bombers must expect savage treatment at the hands of hostile pursuit, and since night bombing—at present inaccurate and indiscriminate—cannot be decisive in itself, we must seek to build even greater speed, higher ceiling, and stronger defensive armament into our forthcoming types. We are doing that.

Parachute troops and air-borne infantry can be highly effective. Our own Army is letting no grass grow under its feet on this score. Glider-borne troops have proved their value in Crete, and the Air Corps is keeping in step with this development by the procurement of gliders and by training selected pilots in gliding and soaring.

Dive-bombers can achieve devastating results, although their use is often accompanied by heavy losses as compared with the horizontal bombing we have always stressed. The A-24 dive-bombers with which we are equipping our squadrons will outperform those of any foreign nation.

Military pilots need not be officers. Accordingly, we have created the grade of Aviation Student to train men who lack the educational requirements for graduating as officers. Eventually, 20 percent of our pilot strength will consist of enlisted men.

An aircraft warning net is indispensable to the operations of defensive fighters and anti-aircraft units, and it must be backed up by a huge force of trained civilian volunteers. Our first Air Defense Command, established at Mitchel Field, is leading the way in this field.

Land and sea operations cannot succeed when the enemy has control of the air. In order to gain control of the air, the enemy's aircraft are best destroyed when actually in the air or in the factory, rather than on their own airdromes as was so widely believed. It is too easy to disperse or conceal aircraft on the ground and protect them with individual parapets so that losses will not be critical.

Where airpower and naval power have come into conflict in the present war, there has not been a single instance where naval power has prevailed over airpower, whereas the invasion of Norway, the sinking of the *Bismarck,* the invasion of Crete, and other engagements have provided examples of airpower prevailing over naval power. Sea power, incidentally, is no longer synonymous with naval power. Sea power is a combination of air and naval power. Its vital importance has never been more clearly recognized than it is today.

Finally, airpower is a factor of utmost importance, at times of supreme importance in war—any kind of war.

THE END

FLYING WING

(Continued from page 15)

World Cruisers. During this time the engineering force consisted of from two to thirty-five men.

In January, 1927, Northrop and four others founded the present Lockheed Aircraft Corp., where he designed the famous Vega which was used in many record flights by Post and Gatty, Earhart, Wilkins, and Frank Hawks. The Vega was the first airplane incorporating the principles of streamlining universally used today. Later, the company became a unit of United Aircraft and built the Northrop Alpha, an all-metal, low-wing craft which was a sensation in its day. TWA used the Alpha in pioneering night-flying and blind-flying on their trans-continental route.

In the Fall of 1931, the activities of the Northrop Company were merged with those of Stearman Aircraft, of Wichita, Kansas. Because of Northrop's desire to remain in California, he, with the assistance of Douglas Aircraft, established a new company which was partially owned by Douglas. From 1932 to 1938 this company operated as the Northrop Corporation, and under his direction it designed and built the Gamma and Delta commercial jobs, the Army A-17 and A-17A attack planes, Navy BT-1 dive-bombers, and military air-

craft for Britain, Russia, Sweden, China, and the Argentine. The A-17A ships, developed in 1936, were purchased in quantity from the Air Corps by the British at the outbreak of the present war, when they needed equipment urgently. These ships are still seeing active service in Europe today. In 1938 Douglas acquired the controlling interests of the Northrop company, which became the present El Segundo Division of Douglas Aircraft.

Mr. Northrop has several other successful inventions to his credit, including the Northill Anchor, which was the first commercially successful light-weight aircraft anchor developed in this country; for five or six years this anchor was used exclusively by the Navy on all its seaplanes and flying boats. Northrop enjoys snow and water skiing, sailing, and motor boating, but has never become proficient at any sport—except that of designing different and more unorthodox aircraft.

THE END

JAP WARPLANES

(Continued from page 13)

550 horse power 9-cylinder air-cooled radial.

Naval Aircraft

THE following listed planes are special naval types; their duties are noted with each.

90-2 KAWANISHI six-place reconnaissance flying boat. Three Rolls-Royce Buzzard 825 horse power liquid-cooled V-12's.

94 KAWANISHI two- or three-place reconnaissance seaplane on twin pontoons. Aichi (Lorraine) 300 horse power 7-cylinder air-cooled radial.

95 KAWANISHI two-place reconnaissance seaplane on single pontoon. (Copy of the Vought Corsair of several years ago.) Aichi (Lorraine) 300 horse power 7-cylinder air-cooled radial.

96 MITSUBISHI two-place torpedo biplane for aircraft carriers. (Similar to Blackburn Shark.) Mitsubishi (Armstrong-Siddeley Tiger) 700 horse power 14-cylinder air-cooled twin-row radial.

Transport Ships

THE following transports are available to the Military and Naval forces alike in case of necessity.

Ambulance TATIKAWA two-place two-stretchers closed biplane. Cirrus Hermes IV 130 horse power air-cooled inverted 4-in-line.

Koken TKYO GASU DENKI low-wing monoplane. Kawasaki (B.M.W.) 800 horse power 9-cylinder air-cooled radial.

MC 20 MITSUBISHI four-crew 20-passenger low-wing monoplane. Two Nakajima 850 horse power 14-cylinder air-cooled twin-row radials.

DC-2 NAKAJIMA (Douglas DC-2) 14-passenger low-wing monoplane. Two Wright Cyclone 710 horse power 9-cylinder air-cooled radials.

AT NAKAJIMA ten-place low-wing monoplane. Two Nakajima Kotobuki IIB 460 horse power 9-cylinder air-cooled radials.

TK 3 NIPPON ten-place high-wing monoplane. Two Nakajima Kotobuki II 450 horse power 9-cylinder air-cooled radials.

Soyokazi MITSUBISHI three- to five-place mid-wing air freighter. Two Mitsubishi Kinsei 900 horsepower 14-cylinder air-cooled twin-row radials.

THE END

VALERI CHKALOV

(Continued from page 38)

According to Greenwich time, a new day was being ushered in. There was only enough oxygen left for an hour's flight. Because of the long stay in high altitudes and fighting cyclonic weather conditions, the crew was approaching exhaustion, and it became necessary to relieve one another at the controls every hour. Then the oxygen gave out entirely and the flyers became nauseated; blood began to flow from Chkalov's nose. Then they decided to come down through the fog, and found that they were over the Pacific.

Night came and went as the steady drone of the engine gave their diminishing strength new hope. Then the lights of a city twinkled beneath them. They came down lower and checked their position. They were over the northernmost tip of the west coast of the U.S.

Signals from American radio beacons became more audible as they flew toward their goal. But as they continued, the fuel gage warning told them that they could not reach their destination—San Francisco. The huge tapered-wing giant swung around wildly and began a slow descent to a flying field at Vancouver, Washington, a few hundred miles short of their goal.

Tired and exhausted, the airmen were lifted from their plane and carried on the shoulders of the admiring throngs. The flight had covered a distance of 5,858 miles in 63 hours and 16 minutes; it was a remarkable piece of navigation. They had laid out a route for the establishment of an eventual airway between the heart of the Soviet Union and the U.S., and which is now again under survey.

The career of Valeri Chkalov was cut short on December 15, 1938, while testing a new low-wing fighter. The funeral of the twice-decorated Hero of the Soviet Union was attended by 350,000 people standing in line in freezing temperature to view his body before it was cremated. The intrepid hero's ashes were placed inside the Kremlin walls.

THE END

Printed in the U.S.A.

You Need LONG-RANGE TRAINING TO REACH Your OBJECTIVE

Aviation has JOBS for thousands, but CAREERS only for trained men!

The National emergency has enabled thousands of men to make a short hop into temporary, single-phase jobs in the aircraft industry through cheap "quickie" courses. BUT—just as America's Air Force depends on its long-range bombers to reach distant objectives, aviation's leaders will only entrust responsible supervisory positions to men with the long-range training to reach any objective to which they may be assigned. The executives who have made aviation THEIR career know that the value of each man is governed by two factors: his serious purpose in selecting aviation as his life work, and THE ABILITY AND EXPERIENCE OF THOSE WHO TRAIN HIM FOR THAT CAREER. They know that Curtiss-Wright Technical Institute graduates are—and for many years have been—thoroughly qualified to fill the industry's most exacting requirements.

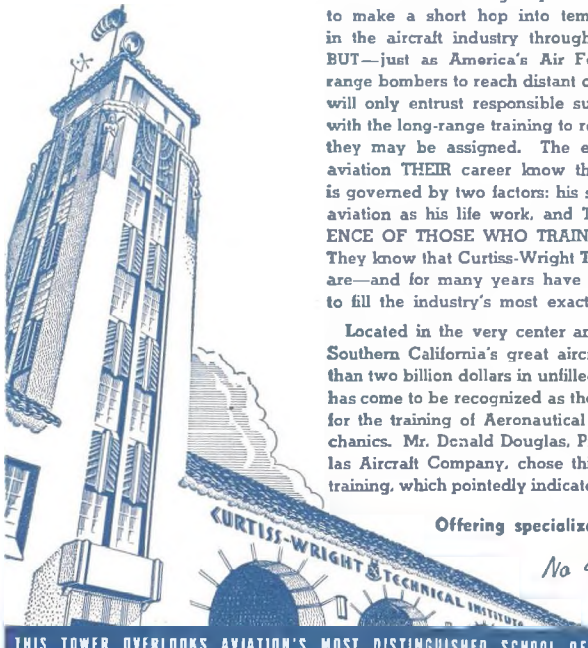
Located in the very center and a very important part of Southern California's great aircraft industry, with its more than two billion dollars in unfilled orders, Curtiss-Wright Tec has come to be recognized as the nation's leading institution for the training of Aeronautical Engineers and Master Mechanics. Mr. Donald Douglas, President of the great Douglas Aircraft Company, chose this school for his own son's training, which pointedly indicates the high standing Curtiss-Wright Tec has attained in the aircraft industry since its establishment in 1929.

It is imperative that before you invest in a course of career training you determine what the returns will be on your investment . . . for your choice of a school in which to take your training will determine how much money you will make all the rest of your life.

Curtiss-Wright Tec's career training is carefully designed to do just one thing:—TO MAKE MONEY FOR YOU, so upon graduation you can be independent and self-supporting for life. Our thousands of successful graduates have proven that Curtiss-Wright Tec training gets results and always pays, since it trained them in advance for the highest position they could ever expect to occupy. It can do the same for you.

This school has never guaranteed positions for its graduates, but practically every graduate has obtained immediate employment and is advancing rapidly. The demand for our graduates far exceeds the supply, and we honestly believe that every student who enrolls here will be able to obtain, with our assistance, immediate employment upon graduation.

WARNING!—"Don't miss the boat." The greatest opportunity in your lifetime exists today! There never was such an opportunity in aviation for you; there may never be another. A position awaits you. Insure for yourself a steady income and independence for life. DON'T FOLLOW—LEAD! Send in your enrollment before you "miss the boat."



THIS TOWER OVERLOOKS AVIATION'S MOST DISTINGUISHED SCHOOL OF AERONAUTICS

Offering specialized and proven training in AERONAUTICAL ENGINEERING & MASTER MECHANICS

No Flying Involved

CURTISS WRIGHT TECHNICAL INSTITUTE

GRAND CENTRAL AIR TERMINAL 1227 AIRWAY GLENDALE (LOS ANGELES) CALIF

UNDER PERSONAL SUPERVISION OF MAJOR C. C. MOSELEY, OWNER, SINCE ITS ESTABLISHMENT IN 1929

Contractor to the U. S. Army Air Corps

BE WISE—PROTECT YOUR FUTURE

MAIL TODAY • DON'T DELAY

WITHOUT COST OR OBLIGATION SEND ME FULL INFORMATION AND CATALOG ON THE COURSE CHECKED BELOW

- ☐ AERONAUTICAL ENGINEERING COURSE
- ☐ MASTER AVIATION MECHANIC COURSE
- ☐ SPECIALIZED ENGINE COURSE
- ☐ SPECIALIZED AIRPLANE COURSE
- ☐ SPECIALIZED AIRCRAFT WELDING COURSE
- ☐ POST GRADUATE AERONAUTICAL ENGINEERING COURSE
- ☐ SPECIALIZED AIRCRAFT SHEET METAL COURSE
- ☐ AERONAUTICAL DRAFTING COURSE, HOME STUDY
- ☐ AIRCRAFT BLUE PRINT READING COURSE, HOME STUDY

NAME

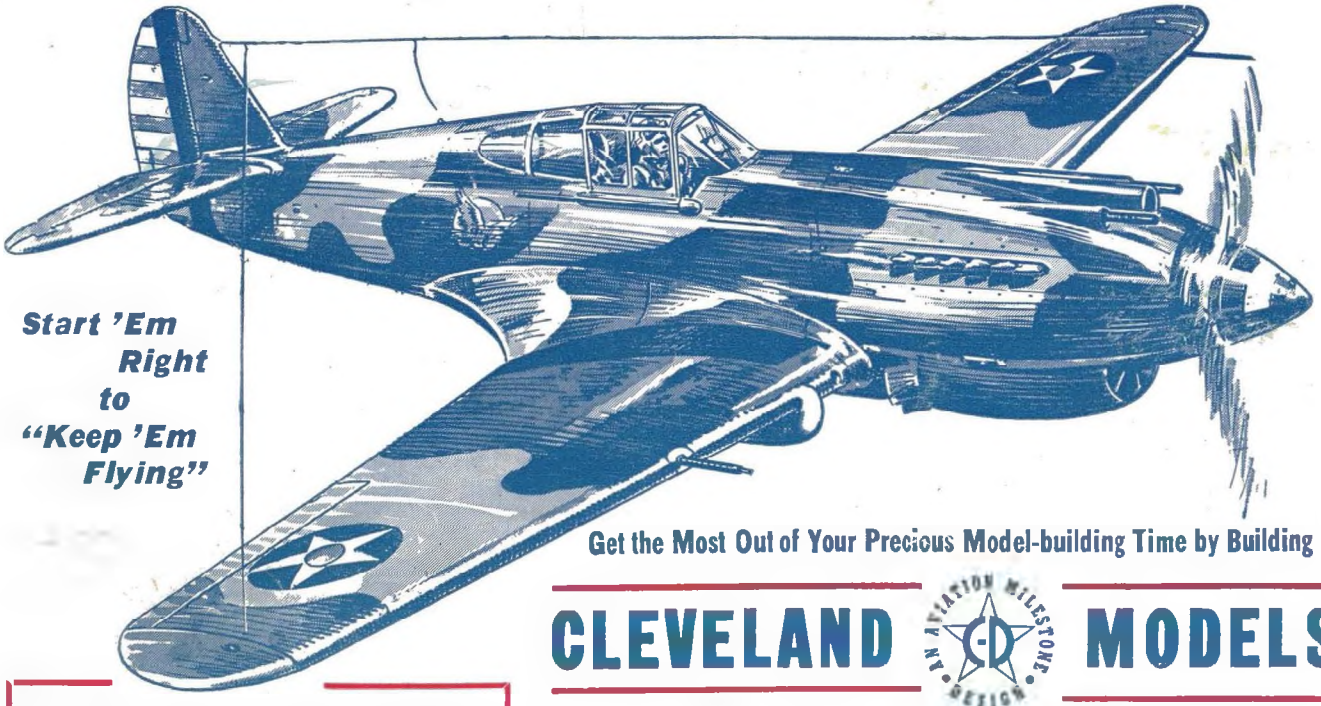
ADDRESS

CITY STATE FA-3

Many of Today's Air Victories Over the Pacific and Europe *Began Years Ago* . . . With the Building of Model Airplanes

OVER 90% OF TODAY'S PILOTS ARE FORMER MODEL BUILDERS

We're constantly receiving orders from men of the R. A. F. and U. S. Air Corps for these World Famous C-D Models . . . "America's First Line of Flying Models"



Start 'Em Right to "Keep 'Em Flying"

Get the Most Out of Your Precious Model-building Time by Building

CLEVELAND C-D MODELS

"They Win More Compliments, More Honors and More Prizes Than Any Other Line of Models in the World"

Build the "MODEL OF THE MONTH"

Building these selected models will give you not only endless hours of keen enjoyment, but keep you in step with Aviation's fast-moving stride. C-D's are designed and engineered in exact scale of the big planes—and so carefully planned that as many as 1,000 or more parts go into the building of many of them.

Curtiss P-40 "TOMAHAWK"

In the export version of the P-40, which is known as the Tomahawk, this design is reputed to equal or better the performance of the famous English Spitfire. Our model for this design follows the very latest refinements as illustrated above. Due to the long projecting nose, it makes an excellent scale flying model. No present-day lineup is complete without this 28½" span beauty. Instructions for camouflaging are also given on the well detailed C-D drawing. Complete Kit No. SF-77 only **$3.00**

25½" Cannon-Plane Airacobra Kit SF-76 ..... **$3.00**

68¾" Lockheed P-38 "Lightning." Kit SF-85. **$4.00**

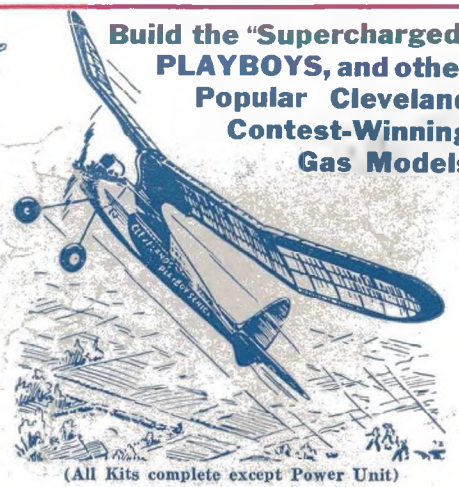
27⅝" British Spitfire. Kit SF-73. **$3.00**

24½" Messerschmitt ME-109. Kit SF-75 .... **$3.00**

31½" Grumman Skyrocket. Kit SF-75. **$3.50**

CURTISS GOS-HAWK F11C-2. Span 23¾". Kit SF-49. **$3.00**

Build the "Supercharged" PLAYBOYS, and other Popular Cleveland Contest-Winning Gas Models



(All Kits complete except Power Unit)

42½" Fleetster. Class A or B. Kit GP-5037, **$2.95**

PLAYBOY SR. Class C Gas. Huge 80" span. Breaking records everywhere. 800 sq. in. Kit GP-5017 (except motor unit) **$4.95**

PLAYBOY JR. Class B Gas. Span 54½" (360 sq. in.) Kit GP-5006 (e.m.u.) **$3.00**

BABY PLAYBOY Class A Gas. Span 33". Biggest gas value on market. Kit GP-5008 (e.m.u.) **$1.00**

33" Itsy Bitsy. Class A. Kit GP-5016 ..... **$1.00**

CATALOGS

Airplane 5c
RR 5c
Ship 5c

ORDERING INSTRUCTIONS If your dealer won't supply you, send check or money order—cash at your own risk. Minimum order $1.00. Shipments to Canada or England, add 10%; other countries, 20%. (Remittances must be in U.S. funds.) For P.P. Special Delivery in U.S., only add 25c. (Ohio residents only, add 3% sales tax.) All kit contents and prices subject to cancellation without notice.

CLEVELAND MODEL & SUPPLY CO., INC.
4508 B22 Lorain Ave., Cleveland, Ohio, U.S.A.